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**QUARTERLY**

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## IN THIS ISSUE

FOR the past several years the Committee on the Study of Social and Psychological Factors Affecting Fertility has been carrying out a cooperative study in its indicated field of interest. This study is sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The Committee is working under the chairmanship of Dr. Lowell J. Reed, and the field work, carried out in Indianapolis under the direction of Professor P. K. Whelpton, has been completed. Two types of field work were involved. First a rapid "household survey" was made in which virtually all white households in Indianapolis were visited in order to locate couples that would qualify for inclusion in a later intensive study. The wide variety of data collected in the intensive study are now being analyzed. In this issue, however, P. K. Whelpton and Clyde V. Kiser present an article based upon the preliminary household survey data, "Differential Fertility Among 41,498 Native-White Couples in Indianapolis." Fertility rates are analyzed by religion of the couple, and for the numerically important religious groups the analysis is extended to further subdivisions by rental value of the home and by educational attainment and birth region of the couple. This article is the first of a contemplated series of reports that will bear the general title Social and Psychological Factors Affecting Fertility.

• • •

The question of whether or not a war is accompanied by an increase in the masculinity ratio at birth is an old one, but it again commands renewed interest. The results from some of the past studies of this intriguing question are reviewed in Professor Constantine Panunzio's article "Are More Males Born in Wartime?" He finds some lack of agreement regarding the reality of the increase and a wide variety of interpretations by students who accepted the existence of the phenomenon. The author himself concludes that "the most that can be said is that there

seems to be some evidence that war does increase the ratio of males at birth. The data, however, fairly substantial though they are, are not sufficiently comprehensive to permit broad conclusions."

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The expectation of life at birth can be regarded as influenced more or less by existing age-specific death rates for each and every cause of death. Public health literature contains instances of attempts to measure the influence of one specific cause of death on expectation of life at a given time or for a series of years. In an article "Maternal Mortality and Length of Life," Mr. Alexander Stevenson utilizes Swedish data for an analysis of the effect of changing incidence of maternal mortality on the life expectancy of females at birth. He attempts to show separately the bearing of declining fertility rates on life expectancy of females. On the basis of rural-urban comparisons he discusses the possible bearing of abortions on maternal mortality and life expectancy.



# SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY<sup>1</sup>

## I. DIFFERENTIAL FERTILITY AMONG 41,498 NATIVE-WHITE COUPLES IN INDIANAPOLIS

P. K. WHELPTON AND CLYDE V. KISER

IT HAS long been recognized by persons interested in population problems that there is need for a better understanding of the human or personal factors underlying the low birth rates of our urban people. More recently there has been a growing popular concern over the failure of urban dwellers to reproduce themselves, which may lead in the not too distant future to demands for some type of legislation designed to encourage larger families. If any such program is to be based upon something more than wishful thinking it will be necessary to have a larger body of factual material than is now available concerning the social and psychological factors affecting fertility. It was a desire to contribute toward such factual material that prompted the formation of the Committee on the Study of Social and Psychological Factors Affecting Fertility and the undertaking of the study to which this report refers. Even though the study should prove inadequate from the standpoint of the analysis of the motivating factors governing fertility, the Committee thought that it would at least help to develop the methodology in this field of inquiry, and bring to light certain worth-while demographic information.

For reasons which will be set forth in a later report, the Committee decided to restrict its intensive study to couples with the following characteristics: husband and wife native white; both Protestant; married in 1927, 1928, or 1929; wife under 30 and husband under

<sup>1</sup> This is the first of a series of reports on a study conducted by the Committee on Social and Psychological Factors Affecting Fertility, sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The Committee consists of Lowell J. Reed, Chairman; Daniel Katz; E. Lowell Kelly; Clyde V. Kiser; Frank Lorimer; Frank W. Notestein; Frederick Osborn; S. A. Switzer; Warren S. Thompson; and P. K. Whelpton.

Form 1		HOUSEHOLD SURVEY OF INDIANAPOLIS Sponsored by the Council of Social Agencies		35-5-193 Card No.	
1. Add. <u>Marcy Lane</u>		Apt. No. <u>—</u>		D. <u>U</u> F. <u>S</u> R. <u>—</u>	
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3. Age: H. <u>40</u> W. <u>38</u>				Date <u>7-1-41</u>	
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8. Age oldest ch. <u>(Udyl. 5)</u>					
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10. Rel. gp. H: P. <input checked="" type="checkbox"/> C. <input type="checkbox"/> J. <input type="checkbox"/> O. <input type="checkbox"/> N. <input type="checkbox"/> W: P. <input checked="" type="checkbox"/> C. <input type="checkbox"/> J. <input type="checkbox"/> O. <input type="checkbox"/> N. <input type="checkbox"/>					
11. Dw. U. O. <u>R.</u> <input checked="" type="checkbox"/> <u>Mo. R.</u> <u>\$ 55</u>					
12. Since mar., always lived cities 25,000+? Y. <input checked="" type="checkbox"/> N. <input type="checkbox"/> Yrs. <u>—</u>					
13. W. usually emp.? Y. <input checked="" type="checkbox"/> Hrs. <u>9 to 5</u> N. <input type="checkbox"/>					
14. W. <u>Mrs. —</u>		15. Coop. G. <u>F.</u> <input checked="" type="checkbox"/> <u>P.</u> <input type="checkbox"/> <u>U.</u> <input type="checkbox"/>			
16. Inf. <u>Wife</u>		17. Date <u>6-26-41</u>		18. Can. <u>9.2</u>	

Fig. 1. The brief schedule used in the Indianapolis Household Survey of 1941. All the items were solicited from native-white couples with wife under 45.

40 at marriage; neither previously married; residents of a large city most of the time since marriage; and both elementary school graduates. In choosing the city to be studied, attention was given chiefly to three criteria: (1) a high proportion of native-white Protestants in the population; (2) an adequate number of couples meeting all of the requirements listed above; and (3) a rounded economy—manufacture, trade, transportation, and professional pursuits. Indianapolis finally was selected.

*The Household Survey.* In order to locate the couples which should be included in this detailed study, it was necessary to contact virtually every white household in the City. This was done in the summer of 1941, the short schedule illustrated in Figure 1 being used. It contains four questions not essential to locating couples for the detailed study, namely, the number of live births to the wife, the number of her children living at the current date, the tenure of the home, and the rent paid or estimated rental value of the house per month. To expedite the field work, the items on race, state of

birth, and age were checked first, and the interview was closed at once if either spouse was colored, or born in a foreign country, or if the wife was over age 44. It was believed that the information thus obtained would permit a worth-while analysis of the relation between fertility and education, economic status, and religion, for wives still in what are ordinarily thought of as the childbearing ages. Although much information is available about the way in which fertility varies with education and economic status, comparatively little is known about the influence of religion on size of family, especially when consideration is taken of the other factors just mentioned. In fact, it was felt that the household survey could add enough to our knowledge of these matters to justify its entire cost. The present report deals with some of the information collected in this household survey. It does not touch the much wider variety of data procured later by skilled interviewers from the couples qualifying for the intensive study, since the analysis of those data has just begun.

In a house-to-house survey of this nature much of the time of the field workers may be taken up by the explanation which they find it necessary to give in order to secure the cooperation of the respondents. It was believed that one way of keeping explanations, refusals, and incorrect replies at a minimum was to secure the local sponsorship of an organization well known and highly regarded by the people. After several influential citizens recommended the Council of Social Agencies as the best possible sponsor, that organization was approached, and its cooperation secured. The Council believed that some of the information to be gathered by the household survey would have specific use in connection with various parts of its regular program, and, in addition, that a scientific study of this nature was worthy of support. As the Indianapolis sponsor of the survey, the Council issued credentials to each canvasser, authorized newspaper publicity, and answered the queries of persons who were suspicious of the interviewers or their questions. In addi-

tion, it provided office space from which to direct the survey for over three months. When an expansion in the work of the Council made it necessary for the study's office force to be moved, the Extension Center of Indiana University very kindly provided space during the remaining three months. Grateful acknowledgment is made to both of these organizations for their assistance.

Several additional steps were taken in the attempt to make the survey highly accurate. First, most of the work was done during June, July, and August, when it was possible to employ school teachers and college seniors with excellent recommendations and a real interest in scientific study. Second, the canvassers were paid by the hour (65c) rather than by the schedule, so that they would not feel under pressure to hurry unduly, omit questions, and skip less accessible dwellings. Third, the canvassers were told that certain of the households would be revisited later by selected interviewers who would check the accuracy of their schedules. Finally, the canvassers were given careful training and supervision.<sup>2</sup>

*Completeness and Accuracy of the Household Survey.* An account of available indications of completeness of coverage and accuracy of data in the household survey is given in Appendix A. Regarding coverage it may be stated here that the 1940 Census, conducted in April, 1940, listed 97,749 dwelling units occupied by whites in Indianapolis. The canvassers in the household survey, making their visits from eleven to fifteen months after the Census date, listed 102,877. Various complications of the survey-Census comparison are discussed in Appendix A but the point to emphasize here is the indication of unusually complete coverage in the household survey.

A good test of the accuracy of data in the household survey is afforded by analysis of replies to certain questions that were repeated in the more intensive study of about 1,500 women, most of whom

<sup>2</sup> The director of the field work (P. K. W.) wishes to acknowledge his indebtedness to Miss Emily Marks, who was in immediate charge of the canvassers.

were paid for their cooperation this second time. A special punch card was prepared for a study of discrepancies between the two sets of data and a full report on this problem will be made later. The comparisons for several items particularly pertinent to the present report are presented and discussed in Appendix A. The items considered are age of wife, total number of children ever born, education of the husband and wife, and monthly rental value of the dwelling unit.

In about 26 per cent of the cases there were discrepancies with regard to age of wife, but three-fourths of these were differences of only one year. In 28 per cent of the cases there were discrepancies regarding education of the husband and in 23 per cent regarding education of the wife. These were mainly differences of only one school year. Discrepancies regarding total number of children ever born occurred in less than 5 per cent of the cases and these were accounted for mainly by presumable understatements or overstatements of one child in the household survey. The worst discrepancies were those regarding rental value of the dwelling unit, due partly to certain resorts to estimates of this item but also to the fact that in coding rental discrepancies there was no factual basis for adjusting the follow-up data to the date of the visit in the household survey. Collectively, however, the results attested to the essential accuracy of the data in the household survey.

In the 102,877 dwelling units occupied by white persons, according to the survey schedules, there were 51,871 native-white married couples with the wife under 45 years of age. With 41,594 of them neither husband nor wife had been married more than once.\* Of

\* Among the remaining 10,277 couples, both husband and wife were reported as married previously in 3,330 cases, the wife alone in 2,917 cases, the husband alone in 3,674 cases, while in 356 cases the schedules failed to show whether or not one spouse or both had been married previously. If information had been secured regarding the number of previous marriages, the age at which they occurred, their duration, and related questions, an extremely interesting analysis could be made of the difference between the fertility of persons whose married life has been interrupted by divorce or death, and that of persons whose married life has not been so interrupted. This information, however, was not collected. The present analysis, therefore, is confined to the 80 per cent of the couples with no interruptions in the married life of either spouse.

these, 96 failed to state the number of children ever born, so the total number of native-white couples included in the present analysis is 41,498. The following pages are devoted to the analysis of internal variations in fertility rates among this group by religion, tenure of home, rental value of the dwelling unit, rent paid by couple, education, and region of birth. It should be borne in mind that throughout all these analyses the data are restricted to unbroken first marriages of native-white couples with the wife under 45 years of age.

#### FERTILITY IN RELATION TO RELIGION ALONE

The broad religious preferences of both the husband and the wife are taken into account in the classification by religion. Of the 41,498 couples in the fertility sample, 80 per cent are classified as "Both Protestant," 10.8 per cent as "Both Catholic," 5.8 per cent as "Protestant-Catholic Mixed Marriages" (with 3.5 per cent "Husband Protestant-Wife Catholic" and 2.3 per cent "Husband Catholic-Wife Protestant"), and 1.0 per cent as "Both Jewish." The remaining couples, of other or unknown religious combinations, comprise 2.3 per cent of the total (*see* Table 1). One interesting aspect of the distribution is that, whereas there are 1,438 "Husband Protestant-Wife Catholic" couples in the sample, there are only

Table 1. Total number of children ever born per 100 wives 15-44 years of age, by religion of the couple. Fertility rates standardized for age. Indianapolis Household Survey, 1941.

RELIGION OF HUSBAND AND WIFE	CHILDREN BORN PER 100 WIVES	NUMBER OF WIVES	PER CENT DISTRIBUTION
ALL RELIGIONS	149	41,498	99.9
Both Protestant	147	33,215	80.0
Both Catholic	173	4,492	10.8
Both Jewish	110	419	1.0
Husband Catholic-Wife Protestant	133	1,438	3.5
Husband Protestant-Wife Catholic	132	975	2.3
Remaining Couples	138	959	2.3

975, or 32 per cent fewer, "Husband Catholic-Wife Protestant" unions. The entire sample presumably includes virtually all once-married native-white couples with the wife under 45 years of age. It is possible, of course, that different results would be found for other areas and for samples not restricted with reference to age, nativity, and absence of previous marriage.

The standardized fertility rates<sup>4</sup> by religion are presented in Table 1. The rate is highest for the Catholic couples and lowest for the Jewish couples. The rate for the Catholic unions is about 18 per cent higher than that for Protestant unions. The Jewish unions are 25 per cent less fertile than the Protestant unions.

A further point of interest is the relatively low fertility rates for Protestant-Catholic mixed marriages. The rates for the "Husband Protestant-Wife Catholic" and the "Husband Catholic-Wife Protestant" marriages are virtually the same, 133 and 132, respectively. These rates are approximately 10 per cent lower than that for the Protestant unions. In view of the substantially higher fertility of Catholic than of Protestant unions, it may appear somewhat surprising that marriages involving one Catholic are less fertile than those involving two Protestants. In the first place, it should be stated that Catholics involved in mixed marriages may tend to be those who departed more easily from orthodox attitudes toward contraception. Also, as indicated in later tables, the fertility differences between the two groups tend to be reduced when comparisons are made specific with reference to rental and educational status.<sup>5</sup> It may be that the low fertility of the mixed marriages arises

<sup>4</sup> The standardized fertility rate is simply a standardized average of the age-specific fertility rates computed for five-year age groups throughout the 15-44 age span. The standardization removes the influence of dissimilar age distributions on the magnitude of the rate for the total 15-44 age period. Standardized rates were computed by weighting the age-specific rates according to the age distribution of the total 41,498 native-white wives in the Indianapolis fertility sample. This distribution is given in footnote 10.

<sup>5</sup> It should be stated, for instance, that the lower fertility rate of the Protestant-Catholic mixed unions than of the Protestant unions is in a small measure associated with higher economic status of the former group. The median monthly rental value of the dwelling unit for the former group is \$30.70 as compared with \$30.17 for the latter. When  
(Continued on page 228)



in part from family instabilities and maladjustments accruing from differences in religion, but available studies yield conflicting results concerning the bearing of differences in religion on marital adjustment.<sup>6</sup>

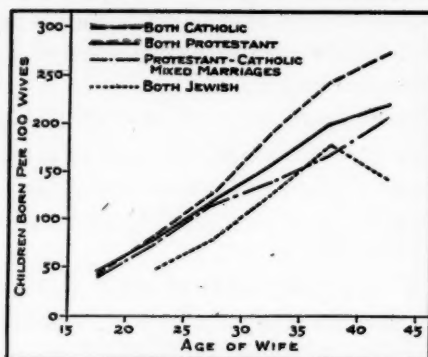


Fig. 2. Total number of children ever born per 100 wives, by age of wife and by religion of the couple. Native-white couples in the Indianapolis Household Survey. See Table 2.

age 30, however, the discrepancies are large and striking. Similarly, at all ages the rates for the Protestant-Catholic mixed marriages fall below those for the Protestant couples, but the differences are not pronounced until after age 30. The age-specific rates for the Jewish couples are based upon small numbers and the observed rate for the age group 40-44 (based on 59 wives) is obviously too low. Despite this, the rates emphasize the low fertility of the Jewish couples.

the fertility rate is standardized for rental value as well as for age, the proportionate excess of the fertility rate for the Protestant group drops from 10 to 8 per cent.

<sup>6</sup> Baber's study, based upon small samples, indicated a somewhat low "happiness rating" for Protestant-Catholic mixed marriages. Kirkpatrick's study, also based upon small samples, yielded "only slight confirmation" of the prevailing conception that mixed marriages tend to be poorly adjusted. Burgess and Cottrell, on the basis of their intensive study of more adequate samples, found no difference of statistical importance in the probabilities of success in marriage when the comparison was made between persons of the same and of different religious belief.

Cf. Baber, Ray E.: *MARRIAGE AND THE FAMILY*. New York, McGraw Hill Book Company, Inc., 1939, pp. 168-169.

Kirkpatrick, Clifford: Factors in Marital Adjustment. *The American Journal of Sociology*, September, 1937, xliii, No. 2, p. 278.

(Continued on page 229)



AGE OF WIFE	ALL RELIGIONS	BOTH PROT- ESTANT	BOTH CATH- OLIC	OTHER AND UNKNOWN			
				Total	Both Jewish	Prot.- Cath. Mixed Mar.	Re- main- ing Couples
CHILDREN BORN PER 100 WIVES							
TOTAL 15-44 <sup>1</sup>	149	147	173	132	110	133	138
15-19	44	45	42*	42	—	39*	46*
20-24	80	35 80	40 82	72	48*	74	76
25-29	120	40 120	46 128	106	79	115	94
30-34	161	38 158	63 191	141	127	139	155
35-39	202	41 199	52 243	175	178*	167	194
40-44	224	20 219	31 274	199	142*	206	207
NUMBER OF WIVES							
TOTAL 15-44	41,498	33,215	4,492	3,791	419	2,413	959
15-19	1,772	1,508	93	171	3	97	71
20-24	7,866	6,362	659	845	65	542	238
25-29	9,099	7,167	1,019	913	107	592	214
30-34	8,662	6,857	1,032	773	106	495	172
35-39	7,548	6,038	905	605	79	379	147
40-44	6,551	5,283	784	484	59	308	117

<sup>1</sup> Rates for totals are standardized for age.

\* Age-specific rate based on 25-39 wives. Rates based on fewer cases are not shown.

Table 2. Total number of children ever born per 100 wives, by age of wife and by religion of the couple. Indianapolis Household Survey, 1941.

With the exception of the obviously unreliable rate for Jewish wives 40-44 years of age, the fertility rates for wives of this age can be regarded as relating to virtually completed families. At these ages the total number of live births per 100 wives is 219 for Protestant unions, 274 for Catholic unions, and 206 for the Protestant-Catholic mixed marriages. Stated in another manner, in this sample of native-white urban wives who are nearing the end of the child-bearing period, the average number of live births per individual

Burgess, Ernest W. and Cottrell, Leonard S.: *PREDICTING SUCCESS OR FAILURE IN MARRIAGE*. New York, Prentice-Hall, Inc., 1939, p. 87.

wife is 2.2 for the Protestant couples, 2.7 for the Catholic couples, and 2.1 for the Protestant-Catholic mixed marriages. The rate for Catholic couples of virtually completed fertility is thus about 25 per cent higher than that for comparable Protestant couples. The rate for the Protestant-Catholic mixed marriages is about 6 per cent lower than that for the Protestant couples of virtually completed fertility.

A better idea of the significance of these figures regarding live births per 100 wives can be obtained by comparing them with the number necessary for the maintenance of a stationary population. At 1940 death rates for Indianapolis, 100 native-white women living to age 45 in the present generation must bear approximately 220 children (of whom 107 would be girls) in order for 100 daughters to live to age 45 in the next generation. Since few children are born to women who fail to marry by age 45, and since about 10 per cent of the white women in Indianapolis aged 45 in 1940 had not been married, 100 native-white *married* women would need to bear approximately 244 children for the replacement of the native-white group. But since about 35 per cent of these women have their marriages broken by death or divorce before age 45, and on this account probably are less fertile as a rule than those whose marriages are not broken, one hundred of the latter women would need to have more than 244 children, probably between 275 and 315, in order to maintain a stationary population.<sup>7</sup> Information is lacking as to the marriage, divorce, and death rates for various educational, rental, and religious groups in the City; hence exact replacement birth rates cannot be computed for them. It is probable, however, that for the Protestant couples in this study the replacement requirement is between 280 and 320 births before the wife reaches age 45, and for the Catholic couples between 255 and 295 births.

In comparing these replacement requirements with the average

<sup>7</sup> The estimates of 275 and 315 assume that the women whose marriages are broken before 45 have *two-thirds* and *one-third*, respectively, as many children as those whose marriages are not broken.

number of births to wives aged 40-44 in Table 2, it is evident that only among Catholic couples are the two approximately equal. The figure of 274 births per 100 Catholic couples is midway between the upper and lower estimates for this group. Among Protestant couples, the average of 219 births per 100 wives aged 40-44 is from one-fifth to one-third below what is needed for maintaining a stationary population. For Jewish couples, and for Catholic-Protestant mixed marriages, the birth rate has failed to meet the replacement requirements by a still larger margin.

To return to a consideration of the standardized fertility rate, it is interesting to observe that this rate is 18 per cent higher for Catholic than for Protestant unions despite the fact that as a group the Catholic couples are of a little better economic status, despite the fact that a larger proportion of the Catholics were born in the North, and despite the fact that the median age at marriage is a little higher for the Catholic wives.\* The comparisons are as follows:

<i>Characteristic</i>	<i>Both Protestant</i>	<i>Both Catholic</i>
Median Rental Value of Dwelling Unit	\$30.17	\$32.88
Per Cent of Couples Born in North	76.6	86.8
Median Bridal Age of Wives 40-44	21.2	22.5

Thus the differences between the fertility rates of Protestant and Catholic couples tend to be enhanced rather than lowered when the above-mentioned factors are held constant. Detailed data on fertility rates by religion, rent, and place of birth, are given in later pages, but two or three comparisons may be in order at this point. Thus, the fertility rate for wives 15-44 standardized for rental value of home as well as for age, is 21 per cent higher for Catholic than

\*The higher economic status and the later bridal ages among Catholic than among Protestant unions were somewhat surprising findings. These situations tended to hold true at all ages (of wives) at enumeration, even when limited to northern-born couples. It should be recalled, however, that the present sample is restricted to native-white couples, and that one reason for the selection of Indianapolis for study was the low proportion of foreign born in the City.

Table 3. Median bridal age in "Both Protestant" and "Both Catholic" unions, by age of wife at enumeration. Indianapolis Household Survey, 1941.

AGE OF WIFE AT ENUMERATION	MEDIAN AGE AT MARRIAGE		NUMBER OF WIVES <sup>1</sup>	
	Both Protestant	Both Catholic	Both Protestant	Both Catholic
15-19	17.7	17.7	1,508	93
20-24	19.3	19.9	6,359	659
25-29	21.0	22.1	7,162	1,018
30-34	21.3	22.9	6,856	1,032
35-39	21.0	22.5	6,032	904
40-44	21.2	22.5	5,279	783

<sup>1</sup> Excluding unknown age at marriage.

Table 4. Total number of children ever born per 100 wives in "Both Protestant" unions, by age of the wife at marriage and at enumeration. Indianapolis Household Survey, 1941.

AGE OF WIFE AT ENUMERATION	AGE OF WIFE AT MARRIAGE									
	Total	Under 17	17-19	20-22	23-25	26-28	29-31	32-34	35 & Over	Un- known
CHILDREN BORN PER 100 WIVES										
15-19	45	84	24	—	—	—	—	—	—	—
20-24	80	174	96	35	5	—	—	—	—	—
25-29	120	249	175	103	46	15	—	—	—	—
30-34	158	293	220	151	99	62	31	21*	—	—
35-39	199	337	265	181	137	99	69	39	23*	—
40-44	219	366	276	207	169	129	69	72*	34*	—
NUMBER OF WIVES										
TOTAL 15-44	33,215	3,616	11,593	9,720	5,049	2,092	714	250	152	19
15-19	1,508	526	982	—	—	—	—	—	—	—
20-24	6,362	767	3,114	2,174	304	—	—	—	—	3
25-29	7,167	605	2,162	2,464	1,536	391	4	—	—	5
30-34	6,857	651	1,964	1,810	1,317	778	294	42	—	1
35-39	6,038	588	1,842	1,705	967	503	237	130	60	6
40-44	5,283	489	1,529	1,567	925	420	179	78	92	4

\* Rate based on 25-99 wives. Rates based on fewer cases are not shown.

AGE OF WIFE AT ENUMERATION	AGE OF WIFE AT MARRIAGE									
	Total	Under 17	17-19	20-21	22-25	26-28	29-31	32-34	35 & Over	Un- known
CHILDREN BORN PER 100 WIVES										
15-19	42	67*	28*	—	—	—	—	—	—	—
20-24	82	200*	112	45	16*	—	—	—	—	—
25-29	128	249*	201	146	74	29*	—	—	—	—
30-34	191	273*	275	223	185	99	38*	—	—	—
35-39	243	326*	313	256	228	200	135*	100*	—	—
40-44	274	394*	351	331	227	191*	165*	—	—	—
NUMBER OF WIVES										
TOTAL 15-44	4,492	236	1,118	1,411	1,006	445	179	64	30	3
15-19	93	33	60	—	—	—	—	—	—	—
20-24	659	41	294	275	49	—	—	—	—	—
25-29	1,019	37	203	378	307	90	3	—	—	1
30-34	1,032	44	203	276	259	170	68	12	—	—
35-39	905	46	198	247	208	103	60	34	8	1
40-44	784	35	160	235	183	82	48	18	22	1

\* Rate based on 25-99 wives. Rates based on fewer cases are not shown.

Table 5. Total number of children ever born per 100 wives in "Both Catholic" unions, by age of the wife at marriage and at enumeration. Indianapolis Household Survey, 1941.

for Protestant couples. (Standardized for age alone, it is only 18 per cent higher.) When the data are restricted to couples born in the North, the fertility rate standardized for age (but regardless of rental value) is also 21 per cent higher for Catholic than for Protestant couples. The rate standardized for age and rental value is 22 per cent higher for the northern-born Catholic couples than for northern-born Protestant couples.

Regarding the influence of age at marriage,<sup>9</sup> it may first be noted

<sup>9</sup>The age of wife at marriage was not specifically asked in the household survey. Provisions were made, however, for recording the calendar year of marriage and age of wife at last birthday. The age-at-marriage classification was derived by a cross-tabulation of these items, taking into account that the survey was made in 1941. It will be noted that any single age at marriage computed by this process is the central age of a two-year span.

(Continued on page 234)

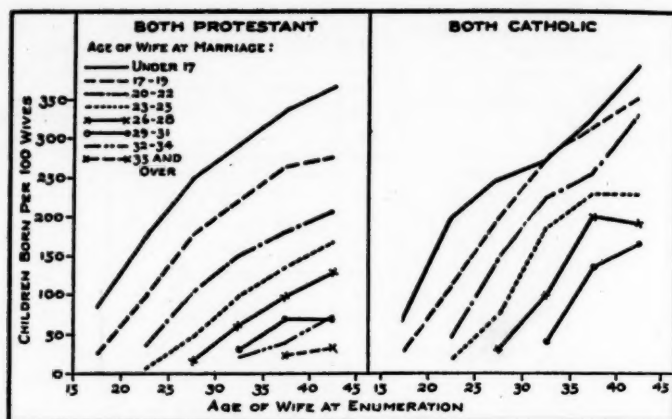


Fig. 3. The relation of age at marriage to age-specific cumulative fertility rates among Protestant and Catholic couples in the Indianapolis Household Survey. See Tables 4 and 5.

in Table 3 that within each age group (of wives at enumeration) from 20-24 through 40-44, the wives in Catholic unions married somewhat later, on the average, than did the comparable Protestant wives. The fertility rates specific for age and age at marriage are presented for the Protestant and Catholic couples separately in Tables 4 and 5. Figure 3 illustrates for both religious groups the extent to which delayed marriage is accompanied by reduction in children ever born per 100 wives at given ages at enumeration. Figure 4, based upon the same data, indicates that, except for wives of very youngest ages at marriage (under 17), the age-specific fertility rates for Catholic couples surpass those for Protestant couples of similar bridal age. The differences are slight, however, at the youngest ages at enumeration considered for each age-at-marriage group.

The bearing of age at marriage on the difference between native-white Protestant and Catholic couples with respect to fertility may be summarized as follows: Whereas the fertility rate for wives 15-44

The influence of this, however, is slight in mass data. This is particularly true when, as in the present instance, the data are used in three-year groupings by age at marriage.

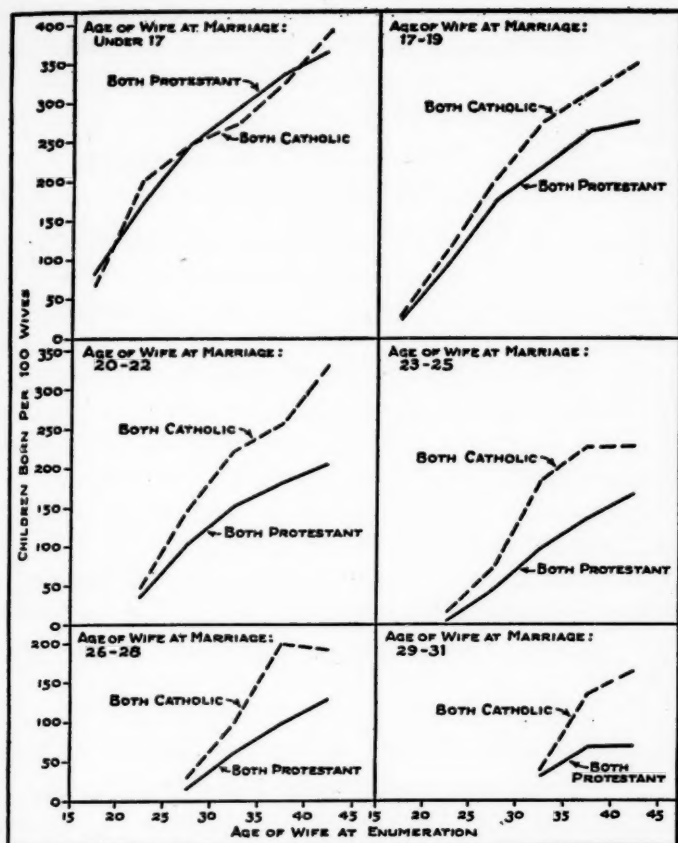


Fig. 4. Total number of children ever born per 100 wives in Protestant and Catholic unions, by age of wife at marriage and at enumeration. Native-white couples in the Indianapolis Household Survey. See Tables 4 and 5.

standardized for age alone is 18 per cent higher for Catholic than for Protestant couples, the rate standardized for age at marriage as well as for age is 30 per cent higher for the Catholic than for the Protestant unions. We have previously noted that in virtually completed families (wives 40-44) the fertility rate for Catholic unions

is 25 per cent higher than that for Protestant couples. If the Catholic wives 40-44 had the same age-at-marriage distribution as the Protestant wives, this age-specific rate would be 36 per cent higher for Catholic than for Protestant unions.

FERTILITY IN RELATION TO RELIGION AND OTHER  
SOCIO-ECONOMIC CHARACTERISTICS

*Tenure of the Home.* The data collected in the household survey permit an unusually detailed classification by tenure of home. Each of the two major groups, owners and renters, is subdivided on the basis of whether the costs were shared with others. In most cases, of course, the costs are shared because the residence itself is shared; so the fertility differentials are essentially those between couples living alone and those living with others. A third major group is kept separate, "Secondary families, living with relatives or friends." As the name indicates, all of the couples in this category were "doubling" with friends and relatives. The age structure suggests that the wives in this group are in large part daughters and daughters-in-law of the household head. Eighteen per cent of these wives are under 20 years of age and 52 per cent are under 25. In the total sample the comparable percentages are 4 and 23, respectively.<sup>30</sup>

The fertility rates by tenure reflect certain selective factors which must be taken into account. As indicated in Table 6, the observed

<sup>30</sup> Age distribution of wives in the total sample and of those reporting that they were living with relatives or friends.

AGE OF WIFE	TOTAL SAMPLE		SECONDARY FAMILIES— LIVING WITH RELATIVES OR FRIENDS	
	Number	Per Cent	Number	Per Cent
TOTAL 15-44	41,498	100.1	1,231	100.0
15-19	1,772	4.3	221	18.0
20-24	7,866	19.0	421	34.2
25-29	9,099	21.9	238	19.3
30-34	8,662	20.9	156	12.7
35-39	7,548	18.2	110	8.9
40-44	6,551	15.8	85	6.9



TENURE	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Religions	Both Protestant	Both Catholic	Other and Unknown		All Religions	Both Protestant	Both Catholic	Other and Unknown	
				Total	Prot.-Cath. Mixed Mar.				Total	Prot.-Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
Owners, Total	147	143	183	132	137	12,139	9,682	1,553	904	540
Not Sharing Costs	147	143	184	132	138	11,953	9,529	1,533	891	533
Sharing Costs	129*	135*	—	—	—	186	153	20	13	7
Renters, Total	155	155	170	136	136	28,031	22,528	2,781	2,722	1,758
Not Sharing Costs	157	156	171	138	138	26,206	21,017	2,648	2,541	1,632
Sharing Costs	127	128	141*	88*	75*	1,825	1,511	133	181	126
Secondary Families Living with Relatives or Friends	103	96	148*	78*	82*	1,231	941	143	147	108
Unknown Tenure						97	64	15	18	7

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Table 6. Total number of children ever born per 100 wives 15-44 years of age, by tenure of the home and by religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

fertility rate standardized for age for all owners in the total sample is a little lower than that for all renters. The Protestant couples (dominating the sample) are responsible for this, for the reverse situation is found for the Catholic couples, and there is virtually no difference between the fertility rates for owners and renters among the Protestant-Catholic mixed marriages. Further analysis indicates that the lower rate for total owners than for total renters among the Protestants simply reflects the relation of economic status to fertility. The economic status of owners, as measured by rental value of the home, is distinctly higher than that of renters in each religious group, but this type of discrepancy is especially pronounced among the Protestants.<sup>11</sup> It will be noted in a later section, Table 9,

<sup>11</sup> To summarize the situation, among Protestant couples the median rental value of the dwelling unit is 39 per cent higher for owners than for renters. Among Catholic couples the excess is only 31 per cent.

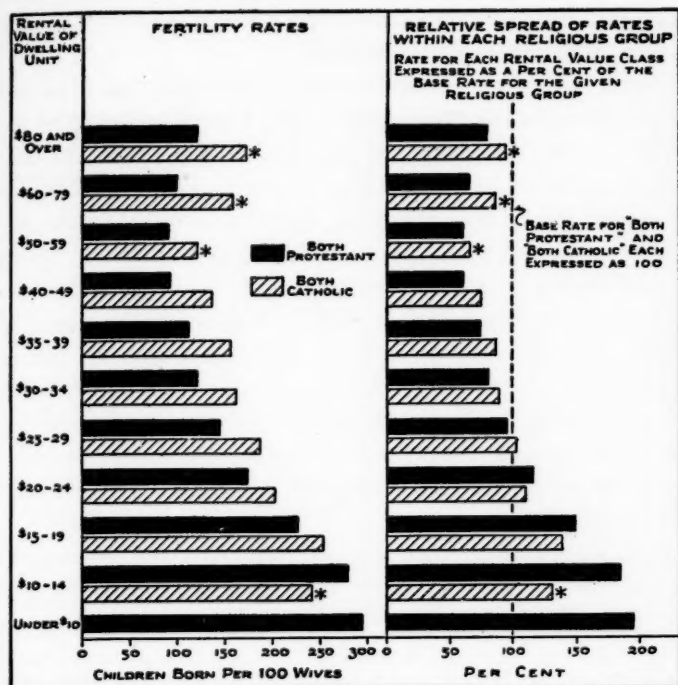
that fertility rates are consistently higher for owners than for renters, *when rental value of the home is held constant*. This type of relation holds true for the Protestant and Catholic unions, considered separately, and also for the total remaining couples. The higher fertility of owners than of renters of similar economic status, however, may in turn be a partially selective situation. Among couples of similar economic status, those with large families and those with strong interests in children probably tend to be especially interested in acquiring a home of their own.

There are several further points of interest in Table 6. First, it will be noted that among both owners and renters, those sharing costs are characterized by lower fertility rates than are those that do not share costs. Secondly, the lowest rates of all are found for

Table 7. Total number of children ever born per 100 wives 15-44 years of age, by monthly rental value of the dwelling unit and by religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

RENTAL VALUE OF DWELLING UNIT	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Religions	Both Protestant	Both Catholic	Other and Unknown		All Religions	Both Protestant	Both Catholic	Other and Unknown	
				Total	Prot.-Cath. Mixed Mar.				Total	Prot.-Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
\$80 and Over	129	120	172*	129*	—	860	619	116	125	43
60-79	105	98	159*	98*	95*	1,878	1,418	221	239	110
50-59	94	91	121*	82*	76*	2,367	1,857	272	238	130
40-49	98	92	137	91	94	5,287	4,110	671	506	314
35-39	117	112	157	112	114*	4,997	4,000	596	401	278
30-34	127	122	162	123	122	5,425	4,277	602	456	319
25-29	149	145	188	131	133	5,973	4,773	684	516	366
20-24	177	175	202	159	157*	4,660	3,813	446	401	276
15-19	228	226	254	227	235*	5,081	4,266	411	404	263
10-14	271	279	241*	245*	183*	2,989	2,524	200	265	157
Under \$10	289	295	—	—	—	717	612	31	74	43
Unknown						1,264	946	152	166	114

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.



\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Fig. 5. Total number of children ever born per 100 wives 15-44 years of age, by monthly rental value of the dwelling unit and by religion of the couple. Native-white couples in the Indianapolis Household Survey. Rates standardized for age. See Table 7.

couples living with relatives or friends who own or rent the dwelling unit. As previously noted, the latter group doubtless consists largely of couples, one member of which is a son or daughter of the household head. The low fertility of this group is believed to be in large part simply a selective situation. Young couples tend to live with their parents more readily if they have no children or few children than if they have a large number.<sup>28</sup> There are probably

<sup>28</sup> Kiser, Clyde V.: Pitfalls in Sampling for Population Study. *Journal of the American Statistical Association*, September, 1934, xxix, No. 187, pp. 250-256.

many individual couples in this group who will leave the parental shelter on the advent of the first child.

*Rental Value of the Dwelling Unit.* Attention may now be turned to the nature of the variations in fertility by rental value of the dwelling unit. These data are presented in Table 7 for the total sample and for three specific religious groups. They are shown for Protestant and Catholic couples in Figure 5. In broad outline, the relation of fertility to rental value of the home is of similar pattern in each religious group. The couples residing in homes of lowest rental value tend to be characterized by highest fertility rates. The fertility rates decrease sharply and consistently with increase of rental value up through the \$50-59 group. Interestingly, for each religious group, the lowest fertility rate by rental value is that for the \$50-59 group. From this point upward in the rental value scale, the *direct* rather than the *inverse* relation of fertility to rental value is found.

Despite the exception at the upper economic levels, however, the inverse relation between fertility and rental value of the dwelling unit is the dominant characteristic. In the total sample, about 87 per cent of the couples reported rental values below \$50 per month, and among these the fertility rates consistently increase with lowering of the reported rental value of the dwelling unit. Among the Protestant couples, the differences between successive rental-value classes are especially marked within the lower brackets of the rental-value scale. The highest proportionate difference between successive classes is that between the \$10-14 and the \$15-19 groups. The former rate is about 23 per cent higher than the latter. This is a wide difference in fertility rates for a rental difference of only \$5 per month.

The generally inverse relation and the exception afforded by the topmost rental-value classes appear to hold true at each age, insofar as the total sample and the Protestant couples are concerned (Table 8 and Figure 6). For the two remaining religious groups, certain erratic characteristics are probably due to small samples. Neverthe-

Table 8. Total number of children ever born per 100 wives, by age of wife, monthly rental value of the dwelling unit, and by religion of the couple. Indianapolis Household Survey, 1941.

RELIGION OF COUPLE AND AGE OF WIFE	CHILDREN BORN PER 100 WIVES							
	Total	\$60 and Over	\$40-59	\$30-39	\$25-29	\$20-24	\$15-19	Under \$15
<b>ALL RELIGIONS</b>								
Total 15-44 <sup>1</sup>	149	112	96	122	149	177	228	274
15-19	44	—	11*	33	38	42	52	68
20-24	80	41	36	53	72	92	113	141
25-29	120	97	70	93	117	134	172	217
30-34	161	133	106	129	159	193	241	299
35-39	202	157	141	169	208	235	326	374
40-44	224	159	162	207	232	284	363	419
<b>Both Protestant</b>								
Total 15-44 <sup>1</sup>	147	104	91	117	145	175	226	282
15-19	45	—	12*	34	38	40	53	69
20-24	80	35*	36	51	72	93	114	143
25-29	120	86	69	90	112	135	173	223
30-34	158	128	100	123	155	190	236	304
35-39	199	147	132	161	204	229	316	391
40-44	219	153	152	196	224	284	362	431
<b>Both Catholic</b>								
Total 15-44 <sup>1</sup>	173	165	132	159	188	202	254	245*
15-19	42*	—	—	—	—	—	—	—
20-24	82	—	46*	71	71	104*	113*	121*
25-29	128	147*	86	111	145	136	174*	198*
30-34	191	168*	145	175	208	223	305*	304*
35-39	243	230	197	225	262	287*	372*	305*
40-44	274	221	233	266	312	317*	390*	347*
<b>Protestant-Catholic Mixed Marriages</b>								
Total 15-44 <sup>1</sup>	133	108*	89	117	133	157*	235*	185*
15-19	39*	—	—	—	—	—	—	—
20-24	74	—	23*	61	75*	78*	114*	121*
25-29	115	—	66*	93	119*	129*	203*	178*
30-34	139	144*	98*	119	133*	145*	224*	229*
35-39	167	123*	126*	160	167*	230*	348*	—
40-44	206	167*	165*	190*	202*	252*	358*	—

<sup>1</sup> Rates for totals are standardized for age.

\* Standardized rate based on 100-299 wives, or age-specific rate based on 25-99 wives. Respective types of rates based on fewer cases are not shown. One exception was the rate shown for 23 wives 35-39 years of age in "Both Catholic" unions. In this case rates for both the adjoining age groups were based upon more than 25 cases. See Appendix B for numerical distribution.

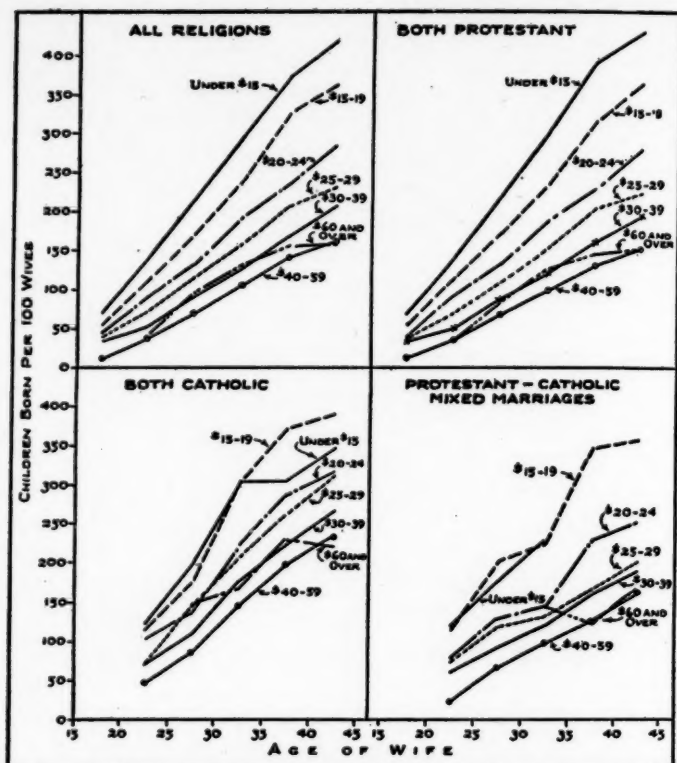


Fig. 6. Total number of children ever born per 100 wives, by age of wife, monthly rental value of the dwelling unit, and religion of the couple. Native-white couples in the Indianapolis Household Survey. See Table 8.

less, even within these groups, the essential pattern of the above-described relationship is manifested.

Several points of interest should be noted regarding Protestant-Catholic comparisons in the fertility-rental relationship. It is apparent that the same general type of relationship exists within both religious groups. However, the interclass differences are more pronounced and the internal range of relative variations in fertility rates is wider in the Protestant than in the Catholic group. This is

most easily visualized in the right-hand section of Figure 5 where the rate for each rental-value class is expressed as a per cent of the base rate<sup>23</sup> for the total religious group concerned. For instance, among Protestant unions, the fertility rate for the \$50-59 group is 40 per cent below the base rate for the Protestants and the rate for the \$10-14 group is 85 per cent above the Protestant base rate. Among the Catholics, the fertility rates for these two rental classes respectively diverge only 34 per cent below and 32 per cent above the base rate for the Catholic unions.

Another point to be noted is that the proportionate excess of Catholic over Protestant fertility tends to increase with rising rental value of the dwelling unit. At the lowest rental-value level for which comparisons by religion approach adequacy, \$10-14, the observed fertility rate of the Catholic couples is about 14 per cent *lower* than that of the Protestants. This may be a chance variation associated with the small sample of Catholics in this rental-value group. In the groups from \$15 to \$50, where the number of Catholic couples is adequate, the excess of the Catholic over the Protestant fertility rate rises consistently with each increase in rental value from 12 per cent at the \$15-19 level to 49 per cent at the \$40-49 level. Above this rental-value level the Catholics are represented by small samples, but the observed proportionate excess of their fertility over that of the Protestants is 33 per cent at the \$50-59 level, 62 per cent at the \$60-79 level, and 43 per cent for couples reporting rental values of \$80 or more per month.

<sup>23</sup> The "base rates" for the "Both Protestant" and "Both Catholic" groups can be regarded as rates standardized for rent as well as for age. The base rate for each was computed by weighting the fertility rate for each rental-value class by the importance of that class in the total sample of native-white couples. Corresponding procedures were used in computing base rates for the analysis of relative variations by educational attainment of the husband and wife. The base rates used for the several exhibits are as follows:

Base Rates—Standardized for Age and:	Both Protestant	Both Catholic
Rental Value of Dwelling Unit	151	183
Education of Husband	147	175
Education of Wife	147	173
Education of Husband and Wife	146	173
Rate Standardized for Age Alone	147	173

Attention may be returned for the moment to the matter of the reversal in the relation of fertility to rental value of the dwelling unit at upper economic levels. A situation comparable to that of Figure 5 was reported by Notestein in his analysis of 1930 Census data for families in the East North Central States.<sup>14</sup> This analysis indicated a higher average number of children under 10 years of age per marriage of 5-9 years duration among urban native-white couples living in houses valued at \$10,000 and over than among those in houses valued at \$5,000 to \$10,000. This type of exception to an otherwise inverse relation was consistently found within each of three subdivisions of the urban population of the region by size of city, and also for the rural nonfarm families. Notestein tentatively interpreted this situation as "the beginning of a reversal in the standard inverse association of fertility and economic status."

A further sidelight on the nature of the reversal at upper rental-value levels is afforded by the breakdown of the Indianapolis material by tenure of the home. These data are presented for the Protestant and Catholic couples separately in Table 9. Figure 7 is restricted to Protestants, however, owing to the greater adequacy of the samples within the top rental-value classes. Even among the Protestants there are only 97 cases of renters reporting rentals of \$80 and over. The immediately lower rental-value groups, however, are represented by fairly adequate numbers of renters as well as owners. Figure 7 clearly indicates that, at least among the Protestants, and at least below the \$80 rental-value level, the actual reversal in fertility rates at upper economic levels occurs only among the home owners. There is a distinct leveling of the fertility rates among renters in the \$40-79 rental-value categories, but no actual reversal.<sup>15</sup>

<sup>14</sup> Notestein, Frank W.: *Differential Fertility in the East North Central States*. The Milbank Memorial Fund *Quarterly*, April, 1938, xvi, No. 2, p. 189.

<sup>15</sup> The sharp bend of the fertility rates at upper economic levels shown in Figure 5 for the total sample of Protestant couples can therefore be attributed to home owners. Although renters outnumber owners in the total sample, quite the reverse is true for couples reporting rental values in excess of \$60 per month.

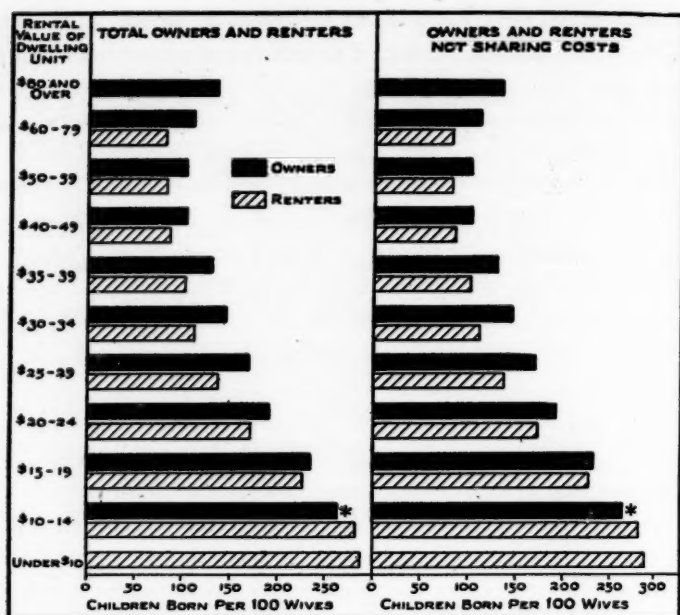


In order to test the possible biasing influence of "doubling" on this situation, the data were restricted to owners and renters not sharing

Table 9. Total number of children ever born per 100 wives 15-44 years of age, by tenure, monthly rental value of dwelling unit, and religion of husband and wife. Data restricted to "Both Protestant" and "Both Catholic" couples, and rates standardized for age. Indianapolis Household Survey, 1941.

RENTAL VALUE OF DWELLING UNIT	BOTH PROTESTANT				BOTH CATHOLIC			
	Total Owners	Total Renters	Owners Not Sharing	Renters Not Sharing	Total Owners	Total Renters	Owners Not Sharing	Renters Not Sharing
CHILDREN BORN PER 100 WIVES								
TOTAL	143	155	143	156	183	170	184	171
\$80 and Over	135	—	134	—	—	—	—	—
60-79	111	83	112	83	184*	—	184*	—
50-59	103	83	102	82	147*	122*	147*	98*
40-49	103	87	104	86	155	118	156	118
35-39	130	103	130	102	177*	142	180*	145
30-34	146	112	146	112	184*	149	184*	149
25-29	169	137	169	138	217*	179	220*	179
20-24	191	171	192	173	—	192	—	192
15-19	233	216	232	228	—	248	—	251
10-14	264*	282	264*	283	—	242*	—	245*
Under \$10	—	288	—	289	—	—	—	—
NUMBER OF WIVES								
TOTAL	9,682	22,528	9,529	21,017	1,553	2,781	1,534	2,648
\$80 and Over	520	97	517	81	96	20	93	18
60-79	927	484	919	446	148	72	148	65
50-59	928	920	913	875	134	138	132	129
40-49	1,773	2,311	1,745	2,137	337	327	332	314
35-39	1,614	2,361	1,595	2,187	268	325	265	307
30-34	1,154	3,091	1,129	2,899	210	476	210	457
25-29	1,165	3,543	1,147	3,291	180	496	176	478
20-24	730	3,029	712	2,867	94	352	93	342
15-19	575	3,632	566	3,427	58	351	58	335
10-14	209	2,286	205	2,193	20	176	19	171
Under \$10	48	556	48	546	3	28	3	28
Unknown	39	218	33	68	5	20	5	4

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.



\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Fig. 7. Total number of children ever born per 100 wives 15-44 years of age, by tenure and rental value of the dwelling unit. Native-white Protestant couples in the Indianapolis Household Survey. Rates standardized for age. See Table 9.

costs. As indicated in Figure 7, however, this restriction effected no material change in the results.

It is possible that the owning of high-priced homes is accompanied by a severer selection of large families than is the renting of expensive apartments. Interpretation, however, must await further analysis. One element of uncertainty is imposed by the fact that the situation observed for Protestant does not parallel that for Catholic couples. Actual reversals of the fertility-rental relationship at high rental-value levels are found among Catholic renters, albeit the instances are based upon small samples. It should also be pointed out that the fertility rate (not shown in Figure 7) is 106 children

per 100 wives for the 97 Protestant couples reporting \$80 and over as rentals of rented homes, and is 125 children per 100 wives for the 8: "renters not sharing" of this economic level. These rates are considerably higher than those for the several groups of successively lower rental status.

Regardless of whether the actual reversal of fertility rates at upper rental-value levels is restricted to home owners, the fact remains that even among home renters the inverse relation virtually ceases at upper economic levels. Furthermore, it must be emphasized that recent studies of class differences in marital fertility have indicated either reversals or virtual equality of fertility rates at upper socio-economic levels and these studies have been based not only upon classifications by rent but also upon those by family income and occupational class.<sup>20</sup> Through the comparison of occupational class fertility in 1931 with that of 1921 in England and Wales, Innes found not only a general reduction in the magnitude of class differences in fertility during the decade under consideration, but also a reversal in the order of the fertility rates within the top ranks of the occupational hierarchy. The latter situation was a result of class differences in the rate of decline of fertility levels. There was no increase in the fertility rate for any class; the recent declines in the rate for the topmost classes were simply smaller than the declines in the "lower" occupational classes.<sup>21</sup> Although there is no direct evidence on the point, the collective findings suggest that the exception to the inverse relation may signify rather rapid infiltration of contraceptive knowledge into the urban groups of middle economic status.

A comparison of the number of children born per 100 wives aged

<sup>20</sup> See Whelpton, P. K.: Geographic and Economic Differentials in Fertility. *The Annals of the American Academy of Political and Social Science*, November, 1936, 188, pp. 48-50.  
Kiser, Clyde V.: *GROUP DIFFERENCES IN URBAN FERTILITY*. Baltimore, The Williams and Wilkins Company, 1942, pp. 55-61, 122-128, 244-246.

<sup>21</sup> Innes, J. W.: Class Birth Rates in England and Wales, 1921-1931. *The Milbank Memorial Fund Quarterly*, January, 1941, xix, No. 1, pp. 72-96.

40-44 in different rental groups with the number necessary for maintaining a stationary population shows that some groups are far below and others far above the maintenance requirements of 280 to 320 births for Protestant couples in the study, and 255 to 295 for Catholic couples.<sup>38</sup> Among the Protestants, each rental group under \$20 has many more than the number of children needed to reproduce the group, and has contributed without question to population growth. (See Table 8.) At rentals of \$25 or more the number of births per 100 Protestant couples is well below the maintenance level, falling short by nearly 50 per cent in the group reporting rental values of \$40 or more. Among Catholic couples with the wife aged 40 to 44, the dividing point is at a higher rental. Each of the rental groups up to \$30 is characterized by a sizable excess of children, and those above \$40 by a deficit. In considering the extreme rental groups, the limitations of small samples must be remembered, but the observed excess above maintenance is larger for Protestants than for Catholics at rentals of under \$15. On the other hand, the *deficit* is much larger for Protestants than for Catholics at rentals of \$60 and over.

*Rent Paid by Couple.* The relation of fertility to rental paid by the couple, Table 10, is essentially the same as that of fertility to rental value of the dwelling unit.<sup>39</sup> It may be stated, however, that the relative spread of the fertility rates by rent paid was not quite so wide as that found on the basis of rental value of the dwelling unit. Among the Protestant unions, for instance, the fertility rates for the \$50-59 groups are virtually the same in the two sets of classifica-

<sup>38</sup> It is known that death rates in most cities vary inversely with rental, but the percentage variations in survival rates are small. Little is known about the relation between the divorce rate and rental in Indianapolis, but the supposition is that it, too, is inverse. It is probable that the birth rate to once-married couples required for population maintenance in Indianapolis varies inversely, but slightly, with rent.

<sup>39</sup> The rent paid by couple generally differs from rental value of the dwelling unit only insofar as couples sharing costs of the dwelling unit are concerned. For owners and renters not sharing costs, the rental value of the dwelling unit was generally considered to be the rent paid by the couple. Exceptions were typified by a couple renting a whole house owned by relatives and paying less than commercial rent.

tions. The 612 couples reporting rental values of the dwelling unit of less than \$10 per month, however, are considerably more fertile, on the average, than are the 954 couples reporting actual outlays of less than \$10 per month. The latter group, of course, probably includes couples who live in homes of moderate or relatively high rental value but for family relationship reasons simply contribute something less than \$10 per month toward the rent or upkeep of the house. This type of selection of secondary families would tend to lower the average fertility rate for the couples reporting payments of under \$10, and this rate would be still lower if couples living with others but contributing nothing at all toward the rent or upkeep were included.

Table 10. Total number of children ever born per 100 wives 15-44 years of age, by rent paid by the couple and by religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

RENT PAID BY COUPLE	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown		All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown	
				Total	Prot.- Cath. Mixed Mar.				Total	Prot.- Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
\$80 and Over	138	125	209*	139*	—	830	598	111	121	42
60-79	106	100	161*	97*	96*	1,813	1,373	212	228	106
50-59	93	90	121*	82*	75*	2,285	1,791	263	231	127
40-49	97	91	137	92	96*	5,021	3,884	653	484	296
35-39	117	112	159	114	110*	4,749	3,799	573	377	260
30-34	127	121	162	122	122*	5,185	4,075	675	435	299
25-29	149	145	188	133	136	5,675	4,515	667	493	346
20-24	174	173	198	152	152*	4,611	3,771	451	389	269
15-19	223	221	247	222	227*	5,161	4,313	430	418	276
10-14	255	262	233*	197	167*	3,345	2,813	226	306	189
Under \$10	260	266	—	198*	—	1,110	954	52	104	62
Share—No Rent	93	94	—	—	—	798	628	75	95	68
Unknown						915	701	104	110	73

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

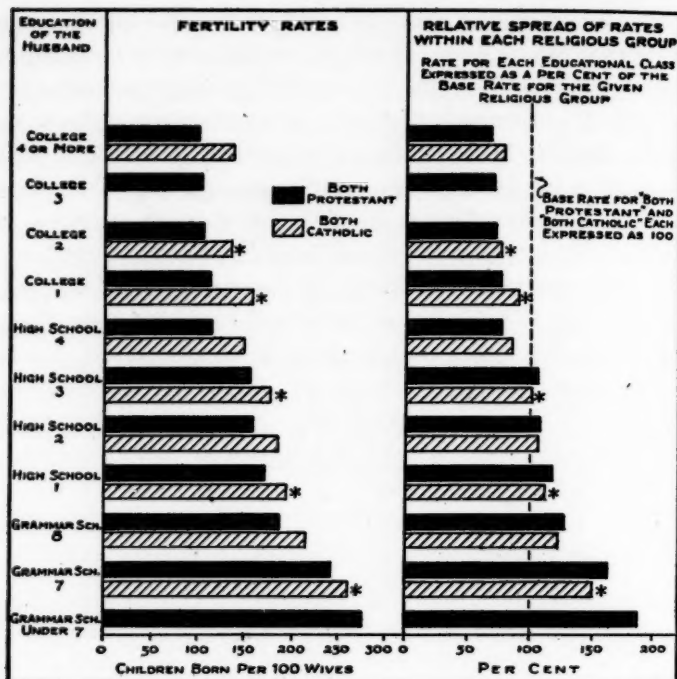


Fig. 8. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment of the husband and by religion of the couple. Native-white couples in the Indianapolis Household Survey. Rates standardized for age. See Table 11.

*Educational Attainment of the Husband and Wife.* Advantage was taken of the opportunity to analyze fertility rates by educational attainment of the husband, by educational attainment of the wife, and by educational attainment of the couple. In considering each spouse separately, rather detailed subdivision by educational attainment can be made. Joint consideration necessitates the use of broader educational classes but affords the obvious advantage of knowing at least the broad class of educational achievement of both members

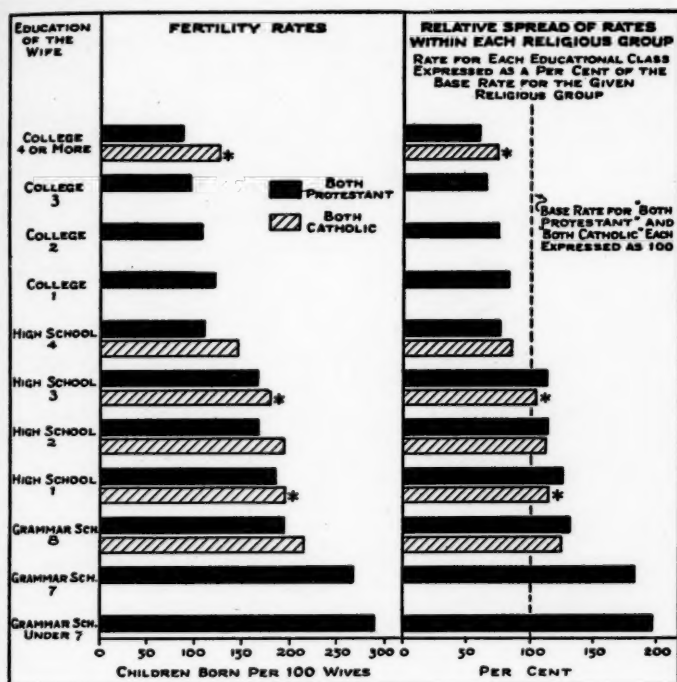


Fig. 9. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment of the wife and by religion of the couple. Native-white couples in the Indianapolis Household Survey. Rates standardized for age. See Table 12.

of the marriage. In each of the three types of classifications the data are shown for all religions combined and for three broad groups separately.

Attention will first be given to classifications based upon the educational attainment of each spouse separately. As noted by comparing Figure 8 with Figure 9 (based on Tables 11 and 12), the general character of the relation between education and fertility is much the same regardless of whether educational attainment relates

EDUCATION OF THE HUSBAND	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown		All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown	
				Total	Prot.- Cath. Mixed Mar.				Total	Prot.- Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
College Total <sup>1</sup>	105	102	142	92	94	7,607	6,162	759	686	408
College 4 or More	102	99	137	91	89*	4,191	3,408	405	378	203
College 3	108	102	—	—	—	676	544	68	64	40
College 2	107	105	134*	99*	—	1,470	1,197	156	117	80
College 1	116	112	157*	—	—	1,052	847	106	99	67
High School Total <sup>1</sup>	134	130	161	124	130	21,937	17,326	2,578	2,033	1,378
High School 4	118	113	148	111	112	12,303	9,702	1,471	1,130	739
High School 3	156	155	176*	148*	147*	2,380	1,950	227	203	162
High School 2	160	157	185	138	146*	4,056	3,169	492	395	277
High School 1	175	171	195*	179*	200*	1,887	1,494	221	172	123
Grammar School Total <sup>1</sup>	204	206	220	174	163	11,154	9,114	1,079	961	591
Grammar School 8	187	188	213	151	147	8,174	6,623	845	706	457
Grammar School 7	243	241	260*	—	—	1,112	933	108	71	41
Grammar School Under 7	272	275	—	272*	—	1,356	1,152	90	114	59
Unknown						800	613	76	111	36

<sup>1</sup> Includes cases that could be coded only with reference to given broad educational class.

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Table 11. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment of the husband and by religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

to the husband or wife, and regardless of the religion of the couple. In each type of classification, increasing educational attainment tends to be accompanied by a lowering of fertility rates. The groups designated as "College 4+" (completed four or more years of college) are generally least fertile and those designated as "Grammar School under 7th" are most fertile.<sup>20</sup> This general pattern holds true for the Catholic as well as for the Protestant unions.

<sup>20</sup> The number of husbands or wives with less than 7th grade education is too small to warrant further subdivision. Although the actual figures presented below suggest a con-

(Continued on page 253)



EDUCATION OF THE WIFE	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Religions	Both Protestant	Both Catholic	Other and Unknown		All Religions	Both Protestant	Both Catholic	Other and Unknown	
				Total	Prot.-Cath. Mixed Mar.				Total	Prot.-Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
College Total <sup>1</sup>	101	99	139	92	89*	5,187	4,383	367	437	228
College 4 or More	88	86	127*	78*	—	2,319	1,969	149	201	—
College 3	102	95	—	—	—	488	400	47	41	—
College 2	111	108	—	129*	—	1,269	1,081	85	103	—
College 1	120	120	—	—	—	962	810	72	80	—
High School Total <sup>1</sup>	133	131	160	115	119	26,141	20,723	3,048	2,370	1,604
High School 4	113	110	146	97	—	15,865	12,427	1,980	1,458	—
High School 3	166	166	179*	148*	—	2,595	2,164	224	207	—
High School 2	168	167	194	142	—	4,444	3,526	493	425	—
High School 1	184	184	196*	165*	—	2,300	1,868	240	192	—
Grammar School Total <sup>1</sup>	210	211	217	188	182	9,652	7,715	1,032	905	560
Grammar School 8	194	193	215	173	—	7,407	5,927	850	690	—
Grammar School 7	259	266	—	—	—	1,005	820	91	94	—
Grammar School Under 7	281	289	—	—	—	989	820	81	88	—
Unknown						518	394	45	79	21

<sup>1</sup> Includes cases that could be coded only with reference to given broad educational class.

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Table 12. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment of the wife and by religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

tinuation of the inverse relation of fertility to educational attainment *within* the under 7th grade group, it should be borne in mind that the small numbers delimit the statistical reliability of the rates and that, whatever the situation, relatively few urban native-white couples of childbearing age now report less than seven completed years of schooling.

EDUCATION	BASED ON EDUCATION OF HUSBAND		BASED ON EDUCATION OF WIFE	
	Children Born Per 100 Wives	Number of Wives	Children Born Per 100 Wives	Number of Wives
G.S. 6 Years	256	626	280	486
G.S. 5 Years	272	343	299	249
G.S. 4 Years	280	250	258	138
G.S. Under 4 Years	327	137	301	116

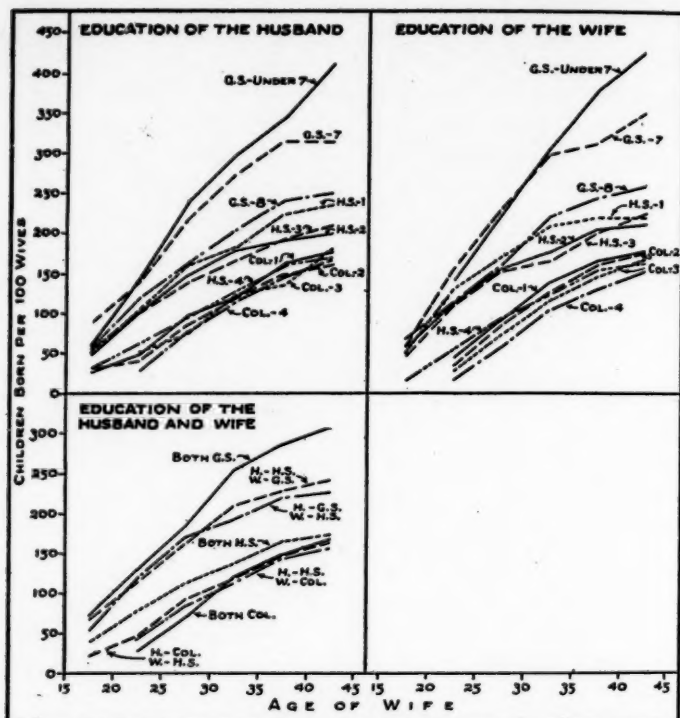


Fig. 10. Total number of children ever born per 100 wives, by age of wife and by educational attainment of the husband, the wife, and the couple. Native-white couples of all religions in the Indianapolis Household Survey. See Table 13.

The decline of the rate with successively higher years of schooling, however, is not of uniform magnitude. Surprisingly enough, the sharpest changes do not occur precisely at the transitions from grammar school to high school and from high school to college status. The largest proportionate differences in fertility rates of successive classes are those between the 7th and 8th grades and those between the H.S. 3 and H.S. 4 groups. Stated in another manner, the fertility rate for the G.S. 8 group is only a little higher than that for the H.S. 1 group. This holds true in classifications based upon

educational status of either the husband or the wife. Likewise, for both types of classifications, the H.S. 4 group is much less fertile than the H.S. 3 group. On the basis of the husband's education, the fertility rate of the H.S. 4 group is virtually the same as that of the College 1 group. Wives in this sample who themselves reported completion of high school are even less fertile than those reporting completion of only one year of college. The above observations apply to the total sample and to the Protestant couples considered separately. Whatever may be the cause, in this sample, at least, the fertility rates of the H.S. 4 groups are more similar to the College 1, 2, and 3 rates than to the H.S. 1, 2, and 3 rates. Likewise, the G.S. 8 fertility rates are closer to the H. S. 1, 2, and 3 rates than to the rates for groups below 8th grade status.

The age-specific fertility rates shown in the top section of Figure 10 (based on Table 13) bear out the above generalization. Furthermore, they suggest that the above described clustering of specific educational classes with respect to fertility level occurs early in married life. On the basis of either the education of the husband or that of the wife, three rather distinct clusterings are visible. Throughout the entire childbearing span the people of college status and the high school graduates are characterized by low levels of fertility. In the intermediate group are the grammar school graduates and those who completed 1-3 years of high school. In conspicuously the highest position with respect to fertility are those who never completed grammar school.

Despite the similarities in pattern, it will be noted that the classification on the basis of the wife's education yields slightly sharper fertility differentials than does that on the basis of the husband's education. A wider range from lowest to highest fertility rates is exhibited in the classification on the basis of the wife's education. Also, when the education of the husband is considered, little in the way of internal variation in fertility rates is found within the college group. In the classification on the basis of the wife's education,

Table 13. Total number of children ever born per 100 wives, 15-44 years of age, by age of wife and by educational attainment of the husband, the wife, and the couple. Data relate to couples of all religions. Indianapolis Household Survey, 1941.

AGE OF WIFE	CHILDREN BORN PER 100 WIVES, BY EDUCATION OF THE HUSBAND											
	Total	Col. 4+	Col. 3	Col. 2	Col. 1	H. S. 4	H. S. 3	H. S. 2	H. S. 1	G. S. 8	G. S. 7	G. S. Under 7
TOTAL 15-44 <sup>1</sup>	149	102	108	107	116	118	156	160	175	187	243	272
15-19	44	—	—	31*	26*	31	52	49	52	57	89*	60*
20-24	80	29	52	42	50	63	105	107	108	120	143	143
25-29	120	77	76	88	98	96	140	149	162	164	218	240
30-34	161	117	125	122	123	129	167	180	184	205	272	297
35-39	202	148	137*	150	165	161	194	192	225	241	315	344
40-44	224	170	183*	163	179	171	210	201	236	250	314	411
CHILDREN BORN PER 100 WIVES, BY EDUCATION OF THE WIFE												
TOTAL 15-44 <sup>1</sup>	149	88	102	111	120	113	166	168	184	194	259	281
15-19	44	—	—	—	—	17	48	58	52	68	60*	—
20-24	80	18	29*	35	47	56	113	116	132	118	156*	141*
25-29	120	60	75	87	95	96	158	159	172	163	233	226
30-34	161	106	120	128	140	126	167	178	211	223	301	307
35-39	202	133	149*	163	168	156	204	207	220	246	314	383
40-44	224	156	170*	174	182	165	225	213	221	260	353	430
CHILDREN BORN PER 100 WIVES, BY EDUCATION OF THE COUPLE												
	Total	Both Col.	Hus. H. S. Wife Col.	Hus. Col. Wife H. S.	Both H. S.	Hus. G. S. Wife H. S.	Hus. H. S. Wife G. S.	Both G. S.				
TOTAL 15-44 <sup>1</sup>	149	101	102	107	127	178	184	223				
15-19	44	—	—	21*	39	53	65	71				
20-24	80	27	42	46	77	118	113	131				
25-29	120	72	84	91	113	171	162	185				
30-34	161	119	112	118	137	193	213	255				
35-39	202	147	143	147	164	220	229	287				
40-44	224	168	156	164	171	226	241	308				

<sup>1</sup> Rates for totals are standardized for age.

\* Standardized rate based on 100-299 cases, or age-specific rate based on 25-99 wives. Respective types of rates based on fewer cases are not shown. See Appendix C for numerical distribution.

however, there is a sharp increase in fertility rates with decrease in the number of reported years at college.<sup>21</sup> This type of difference is also brought out interestingly in the top sections of Figure 10. It will be noted that on the basis of the husband's education the age-specific rates for the four college groups are virtually undifferentiated. On the basis of the wife's education, however, the rates for the several college groups fall nicely into their characteristic order throughout all ages of the childbearing span.

Refinements of the above nature, of course, are lost in the consolidations into broad educational classes. However, several points of interest emerge from the rates for the broad educational groups. Within each religious group the average fertility rate for all wives who are themselves of college status (completed at least one year of college)<sup>22</sup> is just a little lower than the rate for all wives whose husbands are of college status. Similarly, there is virtually no difference between the average rate for all wives of high school status and that for wives whose husbands are of high school status. The average rate for all wives of grammar school status is but little higher than that for all wives whose husbands are of grammar school status.

The range of the fertility rates from that of the college to grammar school and under 7th grade groups is increased somewhat when the educational attainment of both the husband and wife is taken into account. (Cf. Tables 11, 12, 14.) But this greater range is due almost entirely to the higher rate observed for the "Both Grammar School" than for "Wife Grammar School" or "Husband

<sup>21</sup> The factor of age at marriage accounts largely for this type of contrast. The assumption that number of years spent by husbands in college bears less directly on *age of wife at marriage* than does number of years spent at college by the wives themselves, led to a side analysis in which the rates by educational status of the husband were standardized according to the age-at-marriage distributions within the "education of wife" categories. This resulted in an increased internal differentiation of fertility rates within the college group on the basis of the husband's education.

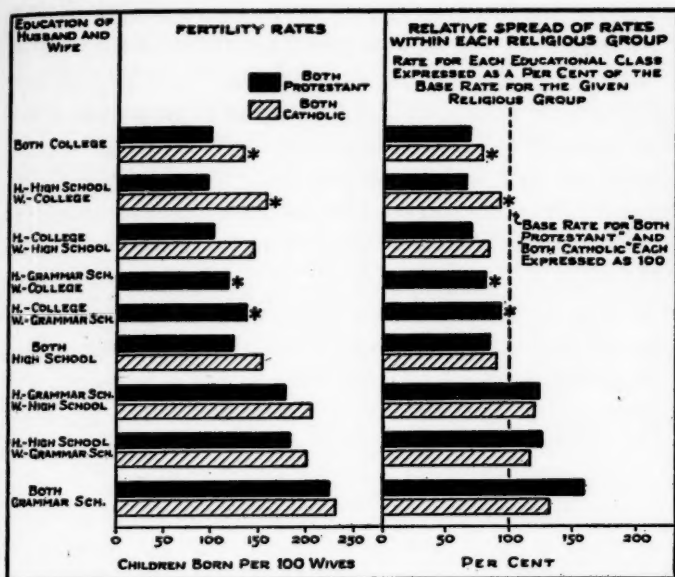
<sup>22</sup> It should be pointed out that since the educational data collected in the household survey (like those of the 1940 Census) relate to *completed years of schooling or highest grade completed*, the consolidated "College Total" group, for instance, excludes individuals who entered college but left before the completion of the first year.

Grammar School" groups. The average rate for couples classified as "Both College" is the same as that for the "Wife College" group and only a little lower than that for the "Husband College" group. Likewise the average fertility rate for the "Both High School" group is only a little lower than that for the "Wife High School" or for the "Husband High School" group.

Table 14. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment and religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

EDUCATION OF HUSBAND AND WIFE	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown		All Reli- gions	Both Prot- estant	Both Cath- olic	Other and Unknown	
				Total	Prot.- Cath. Mixed Mar.				Total	Prot.- Cath. Mixed Mar.
TOTAL	149	147	173	132	133	41,498	33,215	4,492	3,791	2,413
Both College	101	99	134*	83*	80*	3,669	3,126	247	296	154
Husband High— Wife College	102	96	158*	105*	—	1,315	1,086	101	128	65
Husband College— Wife High	107	102	144	96	101*	3,698	2,858	474	366	239
Husband Gram— Wife College	119*	117*	—	—	—	188	159	17	12	8
Husband College— Wife Gram.	139*	137*	—	—	—	228	170	37	21	13
Both High School	127	123	154	114	117	17,811	14,085	2,130	1,596	1,094
Husband Gram— Wife High	178	179	206	138	141*	4,437	3,635	423	379	257
Husband High— Wife Gram.	184	182	200	178	189*	2,784	2,136	343	305	216
Both Grammar School	223	224	230	197	181	6,497	5,290	639	568	326
Both Under 7th Grade	325	331	—	—	—	357	302	20	35	11
Remainder of "Both Gram- mar School"	217	218	230	188	173	6,140	4,988	619	533	315
One or Both Unknown						871	670	81	120	41

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.



\* Rate based on 100-200 wives. Rates based on fewer cases are not shown.

Fig. 11. Total number of children ever born per 100 wives 15-44 years of age, by educational attainment and religion of the couple. Native-white couples in the Indianapolis Household Survey. See Table 14.

The fertility rates of marriages in which the husbands and wives fall into different broad educational classes are perhaps of some special interest from a sociological standpoint. There is a slight suggestion that among Protestant couples the education of the wife exerts a little stronger pull toward the general inverse association between fertility and education than does the schooling of the husband. For instance, the fertility rate for the "Husband College—Wife High School" group is a few points higher than that for the "Husband High School—Wife College" group, Figure 11. Similarly, the rate for the "Husband High School—Wife Grammar School" combination is a little higher than that for the "Husband Grammar School—Wife High School" unions. Larger differences

in the same direction are found in the small groups in which there are wider gaps between the educational attainment of the husband and wife. Thus, among Protestant couples the "Husband College—Wife Grammar School" marriages are about 17 per cent more fertile than the "Husband Grammar School—Wife College" unions. It should be emphasized, however, that, except in the latter instances, the differences between the rates considered are small and that among Catholic couples they run in the opposite direction. Furthermore, it is quite likely that if, among Protestants, the education of the wife really has any closer bearing on the fertility of the couple than does education of the husband, the situation could be accounted for in part by the factor of age at marriage. The general question of relative influence of the husband and wife will be more fully explored when the data secured in the intensive study become available.

Age-specific fertility rates are shown for the "Both College," "Both High School," and "Both Grammar School" couples, by religion, in Table 15 and Figure 12. The characteristic alignment of these broad educational classes with respect to fertility persists within each religious group and at each age. An interesting point revealed by Figure 12, however, is that despite the conspicuously low fertility rate of the "Both College" group as compared with the "Both High School" group during the early and middle period of the childbearing span, at ages 40-44 the rate for the college group is about as high as, or higher than, that for the high school group. This holds true for the total sample and for the Protestant and Catholic couples considered separately. It is possible that this situation reflects a greater tendency of the college couples to space their children. Whatever the interpretation may be, it is of interest that despite any disadvantage that may have existed with respect to later age at marriage, the completed families of the college couples in this sample are as large as those of the couples of high school status.



Table 15. Total number of children ever born per 100 wives, by age of wife and by broad educational attainment and religion of the couple. Indianapolis Household Survey, 1941.

RELIGION OF THE COUPLE AND AGE OF WIFE	CHILDREN BORN PER 100 WIVES			NUMBER OF WIVES		
	Both College	Both High School	Both Grammar School	Both College	Both High School	Both Grammar School
<b>ALL RELIGIONS</b>						
Total 15-44 <sup>1</sup>	101	127	223	3,669	17,811	6,497
15-19	—	39	71	18	1,110	170
20-24	27	77	131	460	4,644	568
25-29	72	113	185	856	4,626	779
30-34	119	137	255	975	3,372	1,221
35-39	147	164	287	765	2,318	1,818
40-44	168	171	308	595	1,741	1,941
<b>Both Protestant</b>						
Total 15-44 <sup>1</sup>	99	123	224	3,126	14,085	5,290
15-19	—	39	76	17	942	139
20-24	29	78	127	396	3,729	471
25-29	68	113	192	704	3,633	643
30-34	119	130	262	816	2,619	990
35-39	145	157	286	675	1,789	1,478
40-44	166	164	305	518	1,373	1,569
<b>Both Catholic</b>						
Total 15-44 <sup>1</sup>	134*	154	230	247	2,130	639
15-19	—	38*	—	—	73	4
20-24	—	79	153*	22	428	32
25-29	100*	120	147*	68	579	53
30-34	142*	180	241	71	458	128
35-39	214*	209	319	49	339	193
40-44	232*	224	351	37	253	229
<b>Protestant-Catholic Mixed Marriages</b>						
Total 15-44 <sup>1</sup>	80*	117	181	154	1,094	326
15-19	—	39*	—	—	66	8
20-24	21*	72	127*	28	345	26
25-29	73*	106	177*	40	295	43
30-34	120*	136	167*	46	191	61
35-39	80*	141	245*	25	120	86
40-44	—	153*	243	15	77	102

<sup>1</sup> Rates for totals are standardized for age.

\* Standardized rate based on 100-299 wives, or age-specific rate based on 25-99 wives. Respective types of rates based on fewer cases are not shown.

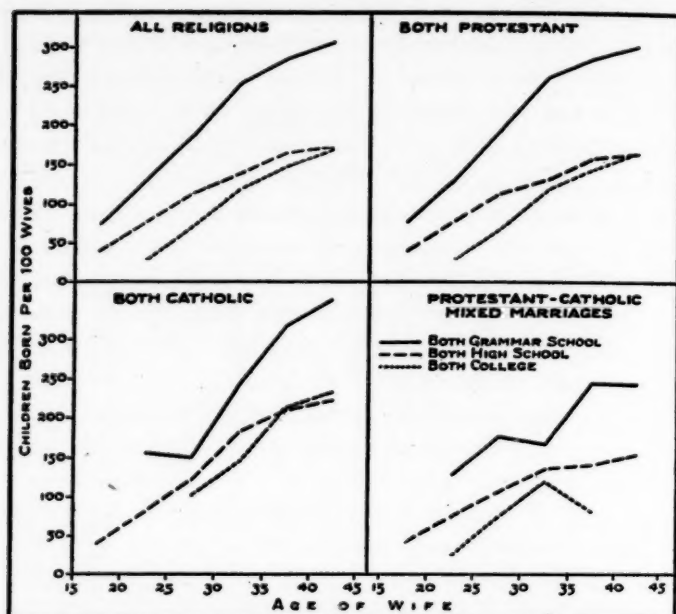


Fig. 12. Total number of children ever born per 100 wives, by age of wife and by educational attainment and religion of the couple. Native-white couples in the Indianapolis Household Survey. See Table 15.

*Educational Differentials in Fertility by Religion.* On the general question of educational differentials in fertility by religion the following points may be made. First, at each educational level the fertility rate of Catholic couples surpasses that of Protestant couples. Second, for the educational classes in which the data approach adequacy, the rates for the Protestant-Catholic mixed marriages generally fall below those for the Protestant unions. Third, despite similarities of pattern, the internal variations in fertility by educational attainment are wider and more pronounced among Protestant than among Catholic unions. This fact is graphically expressed in the right-hand sections of Figures 8, 9, and 11. The relative variations by education of the wife may be taken as an example. The

fertility rate for the Protestant wives of college status is found to be 33 per cent below the base rate (*see* footnote 13) for all Protestant couples. The rate for wives of grammar school status is 44 per cent above the same base rate. Among Catholics, the fertility rates for these two educational groups are, respectively, only 19 per cent below and 26 per cent above the base rate for Catholic unions.

Related to the above situation is the fact that the proportionate excess of the rate for Catholic couples over that for Protestant couples tends to decrease with lowering of educational status. Thus, on the basis of the husband's education, at the college level, the Catholic marriages are 39 per cent more fertile than the Protestant marriages. At the high school level they are 24 per cent more fertile, and at the grammar school level they are 7 per cent more fertile. On the basis of the wife's education, the corresponding percentage excesses of the Catholic fertility rates over those for the Protestants are 40 for the college level, 22 for the high school, and 3 for the grammar school level. Catholic unions in which both husband and wife are of college status are 35 per cent more fertile than Protestant unions of comparable education. The Catholic "Both High School" rate is 25 per cent higher than the Protestant "Both High School" rate. Catholic unions in which neither member has gone beyond grammar school are only 3 per cent more fertile than Protestant unions of a similarly meager amount of schooling.

Situations analogous to the above were discussed earlier insofar as groupings by rental are concerned (pp. 242-243). They collectively suggest that at the lowest rungs of the socio-economic ladder, contraceptive practice may not be much more prevalent among Protestants than among Catholics. Although the present data afford no direct evidence on the point, the supposition is that with improved economic or educational status Protestant unions adopt these practices with greater frequency than do Catholic unions.

Referring again to the number of births per 100 couples needed to maintain a stationary population (280 to 320 for Protestant and

255 to 295 for Catholic couples with the wife aged 40 to 44), the deficit is large for the "Both College" and "Both High School" groups of Protestant and Protestant-Catholic couples. For Catholic couples of these educational attainments there is also a deficit, but it is small. In the "Both Grammar School" group, the births to Protestant couples approximate the maintenance figure, but births to Protestant-Catholic couples are well below it, and births to Catholic couples are well above it. (See Table 15.)

#### DIFFERENTIAL FERTILITY BY REGION OF BIRTH

The state-of-birth data obtained in the household survey were utilized for establishing the following classes:

Husband and wife born in North  
Husband born in North—Wife born in South  
Husband born in South—Wife born in North  
Husband and wife born in South

Since most of the southern-born whites in Indianapolis are Protestants, the comparisons of fertility rates by region of birth<sup>22</sup> are restricted mainly to the "Both Protestant" group.

As indicated in Table 16, among Protestant native-white marriages the standardized fertility rate by region of birth is lowest for the "Both North" group and highest for the "Both South" group. The "Husband North—Wife South" marriages are substantially less fertile than the "Husband South—Wife North" unions. This order of fertility rates of Protestant couples holds true at all ages of the childbearing span, but the variations are not of much consequence before age (of wife) 20. Throughout all ages the northern-born Jewish couples are least fertile of all. The fertility rate of the

<sup>22</sup> Census usage was followed in the consignment of specific states to the "South" category. The "North" category could be more precisely designated as "North or West," since it includes all nonsouthern states. The "South" group is heavily represented by natives of Kentucky and Tennessee; the "North" group by natives of Indiana, Ohio, and Illinois.

AGE OF WIFE	BOTH PROTESTANT				BOTH CATHOLIC AND BOTH NORTH	BOTH JEWISH AND BOTH NORTH
	Both North	H. North W. South	H. South W. North	Both South		
CHILDREN BORN PER 100 WIVES						
TOTAL 15-44 <sup>1</sup>	141	157	173	206	171	115
15-19	43	44	46	64*	41*	—
20-24	78	89	98	101	81	49*
25-29	116	136	146	147	127	83*
30-34	151	161	188	229	189	126*
35-39	188	214	226	297	240	184*
40-44	209	223	255	316	272	162*
NUMBER OF WIVES						
TOTAL 15-44	25,453	2,103	2,408	2,322	3,899	347
15-19	1,106	128	149	96	79	3
20-24	4,969	378	449	404	557	55
25-29	5,480	472	532	460	900	96
30-34	5,159	459	536	500	896	88
35-39	4,618	369	416	475	795	63
40-44	4,121	297	326	387	672	42

<sup>1</sup> Rates for totals are standardized for age.

\* Age specific rate based on 25-39 wives. Rates based on fewer cases are not shown.

Table 16. Total number of children ever born per 100 wives, by age of wife, and by birth region and religion of the couple. Indianapolis Household Survey, 1941.

northern-born Catholic couples falls about midway between that of the northern-born Protestant couples and that of the southern-born Protestant couples. (See Figure 13.)

The order of fertility rates by region of birth of Protestant couples in this study is similar to that found by Thompson for Butler County, Ohio. On the basis of the fact that the "Husband North—Wife South" couples were less fertile than the "Husband South—Wife North" couples in Butler County, Thompson suggested the hypothesis that "the attitude of the husband towards the control of the size of the family is fully as important as, probably more im-

portant than, that of the wife."<sup>24</sup> Although the Indianapolis household survey data suggest that birth region of the husband bears a closer relation to size of family than does birth region of the wife,

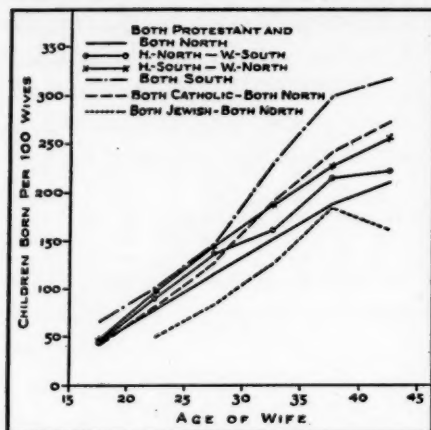


Fig. 13. Total number of children ever born per 100 wives, by age of wife and by birth-region and religion of the couple. Native-white couples in the Indianapolis Household Survey. See Table 16.

for the "Both North" they cannot be used to support any further generalization that the attitude of the husband is predominant in determining size of family. We have already noted, for instance, the suggestion of a somewhat closer relation of fertility to education of wife than to education of husband.<sup>25</sup>

Between the fertility rates and "Both South" Protestant couples is due in large part to the higher economic status of the former group. Thus, the fertility rate, standardized for age but regardless of rental value, is 46 per cent higher for the "Both South" than for the "Both North" group. Within no specific rental-value class for which the comparison can be made, however, (see Table 17) is the excess as much as 20 per cent. This also holds true with reference to available comparisons within similar educational classes listed in Table 18.

<sup>24</sup> Thompson, Warren S., *et al.*: Average Number of Children Per Woman in Butler County, Ohio, 1930. A Census monograph prepared in cooperation with the Scripps Foundation for Research in Population Problems. U. S. Bureau of the Census, Washington, 1941, p. 51.

<sup>25</sup> A side analysis of the Indianapolis material indicated that ages at marriage were a little, but not substantially, later for the "Husband North—Wife South" than for the "Husband (Continued on page 267)

RENTAL VALUE OF DWELLING UNIT	CHILDREN BORN PER 100 WIVES					NUMBER OF WIVES				
	BOTH PROTESTANT				Both Cath- olic and Both North	BOTH PROTESTANT				Both Cath- olic and Both North
	Both North	H. North W. South	H. South W. North	Both South		Both North	H. North W. South	H. South W. North	Both South	
TOTAL	141	157	173	206	171	25,453	2,103	2,408	2,322	3,899
\$80 and Over	119	—	—	—	—	508	30	22	15	97
60-79	98	—	—	—	163*	1,199	61	63	39	197
50-59	91	—	—	—	123*	1,574	88	80	44	244
40-49	91	86*	108*	108*	137	3,393	210	232	128	596
35-39	112	129*	111*	130*	160	3,270	202	253	141	535
30-34	121	138*	123*	138*	160	3,441	246	250	210	612
25-29	144	141	158	161	191	3,668	312	348	310	578
20-24	171	175*	195	198	194	2,756	282	326	356	377
15-19	221	205	225	263	249	2,900	347	399	550	343
10-14	275	261*	303*	287	234*	1,608	222	288	394	162
Under \$10	289	—	—	294*	—	372	59	73	100	27
Unknown						764	44	74	35	131

\* Rate based on 100-299 wives. Rates based on fewer cases are not shown.

Table 17. Total number of children ever born per 100 wives 15-44 years of age, by rental value of dwelling unit and by birth region and religion of the couple. Rates standardized for age. Indianapolis Household Survey, 1941.

Unlike the Butler County data previously referred to, the present materials afford no indication that the proportionate excess of the fertility of southern-born couples over that of northern-born couples is most pronounced at the lowest economic levels, or that it tends to disappear at highest economic levels. In fact, the two lowest proportionate excesses of the fertility rate of Protestant southern-born couples over Protestant northern-born couples are those for the two lowest rental-value classes. It is true that the samples are small for southern-born couples reporting rental values of less than \$15. On the other hand, the highest proportionate excess (19 per cent) is found for both the \$15-19 and the \$40-49 rental-value groups. The

South—Wife North" group. This is probably associated with the premarital migration of women in the former group. The median bridal age of the "Both South" group was conspicuously low, but in these cases larger proportions of the marriages were doubtless contracted in the South, before migration, than was the case for the "Husband North—Wife South" group.





14 per cent more fertile than the northern born. The excess is 15 per cent for "Both Grammar School" couples and 12 per cent for "Both Under 7th Grade" couples. It should be emphasized that the samples permit no comparisons at the very highest rental-value and educational levels. On the basis of what is available, however, one cannot make the type of generalization that was made for the Butler County material, that is, "low economic status favored the retention of those social and cultural differences between north-born and south-born people in this County which make for differences in fertility, while good economic status tended to reduce the fertility of all groups, classes, and marriage combinations to a common level."<sup>20</sup>

Among the Protestant couples with the wife aged 40 to 44, only the southern born have enough children (316 per 100 couples) to meet approximately the requirement for maintaining a stationary population. The group "Husband South—Wife North" falls below the replacement level by 10 to 20 per cent, the group "Husband North—Wife South" by 20 to 30 per cent, and the group "Both North" by 25 to 35 per cent. (See Table 16).

#### RELATION TO SUBSEQUENT REPORTS

In addition to contributing to what is known about fertility differentials, particularly those between religious groups, the information available from the household survey provides a frame of reference for the detailed investigation which followed it. In the total household survey there is an average of 224 children per 100 wives 40-44 years of age, or around 20 to 30 per cent less than the number necessary for population maintenance. For the more favored economic and educational groups—whose people are most able to provide their children with most of the things thought desirable to a proper upbringing—the deficit is much larger, whereas for the less favored economic and educational group it is much smaller,

<sup>20</sup> Thompson, Warren S., *et al.*: *Ibid.*, p. 11.

and in some cases there is even a surplus. As mentioned earlier, the detailed investigation was confined to native-white Protestant couples in which both husband and wife had completed grammar school. The generally low fertility rate of such a group can in a sense be regarded as that toward which all urban groups are approaching. Clearly, then, the intensive study deals with a group of particular interest to those concerned with the falling national birth rate, the changes in quality which it may be causing, and the possible need for a population policy in the future.

Although this report has presented only the average number of live births to couples in various religious, rental, and educational groups, the proportion of couples in each of these groups which has zero, one, two, or other numbers of children is available. A later report will deal with these data for the couples considered here. Subsequently, the analysis of the smaller number of detailed schedules should throw light on the reasons why some of the couples in a particular group have one child or none at all while others have three or four.

#### SUMMARY

In the summer of 1941 virtually every white household in Indianapolis was visited for the purpose of identifying couples that would meet specific requirements for inclusion in a subsequent intensive study of social and psychological factors affecting fertility.

Regardless of whether they were found to qualify for inclusion in the subsequent intensive study, all of the contacted native-white married couples with wife under 45 were asked to supply the few descriptive facts which form the basis for the present analysis of differential fertility by religion and other characteristics.

In this group, Catholic couples are 18 per cent more fertile on the average than Protestant unions. Mixed Protestant-Catholic marriages on the other hand are 10 per cent less fertile than Protestant unions. Jewish couples constitute a small sample but these are the

least fertile group; they are 25 per cent less fertile on the average than the Protestant couples.

In general, the traditional inverse relation of fertility to socio-economic status is found for both Protestant and Catholic marriages. This is true in the analysis of fertility by rental value of the dwelling unit, rent paid by the couple, and educational attainment of the husband and wife.

An exception to the inverse relation occurs within the upper rental-value brackets. Above the \$50-59 rental group the fertility rates increase with rising rental level. The home owners appear to be mainly responsible for this reversal, but among the renters there is at least a distinct leveling off of the fertility rates with increase of rental value, within the upper rental-value brackets.

Although the relation of fertility to socio-economic status follows the same general pattern within the Catholic as within the Protestant groups, the relative range of the internal variations is much less pronounced in the Catholic group. For instance, among Protestant unions the fertility rate for the \$50-59 group is 40 per cent below, and that for the \$10-14 group is 85 per cent above, the base rate for all Protestant unions. Among Catholic unions the fertility rates for these two rental-value classes are respectively 34 per cent below and 32 per cent above the base rate for all Catholic unions. (In each case the base rate is adjusted to the internal distribution of the total sample with respect to rental value.)

Although the fertility rates of Catholic couples tend to exceed those of Protestant couples at most socio-economic levels, this may not be true at the lowest rental-value levels. At all events, the proportionate excess of the fertility rates of Catholic couples definitely tends to decrease with lowering of socio-economic status. Thus, at rental-value levels of \$80 and over, the rate for Catholics is 43 per cent higher than that for Protestants. At the \$15-19 rental-value level, it is only 12 per cent higher. On the basis of the wife's education, the fertility rate for Catholic couples exceeds that for Protes-

tant couples by 40 per cent at the college level, but by only 3 per cent at the grammar school level. On the basis of the husband's education, the comparable figures are 39 per cent and 7 per cent. Catholic couples of "Both College" status are 35 per cent more fertile than Protestant couples of comparable education. On the other hand, the fertility rate for Catholic couples of "Both Grammar School" status is only 3 per cent higher than that for Protestant couples of this same limited education.

The classification of Protestant unions by birth region of the husband and wife yields lowest fertility rates for the northern-born couples and highest rates for the southern-born couples.

The number of children ever born per 100 wives 40-44 in the sample may be interpreted in terms of the requirements for permanent replacement of a population through births. By religion, only the Catholic couples in the sample appear to be characterized by an average rate approximating this requirement. The observed rate for wives 40-44 in Protestant unions in the sample is from one-fifth to one-third below replacement requirements and the deficit is even larger for Jewish couples and for Protestant-Catholic mixed marriages.

For both Catholic and Protestant unions in the upper rental and educational classes, the fertility rates of wives 40-44 are below replacement requirements but the deficits are generally larger for the Protestants than for the Catholics. Among all Protestant couples in which the wife was 40-44 and in which both the husband and wife had completed at least one year of high school, the fertility rate is approximately 40-48 per cent below that required for permanent replacement of the group through births. The urban Protestant couples of this moderate or higher amount of education are, by virtue of their proportionate importance, mainly responsible for the low fertility rates of urban areas. It is this group to which the intensive study of social and psychological factors affecting fertility is restricted. Reports on the intensive data will appear later.

## APPENDIX A

TESTS FOR COMPLETENESS OF COVERAGE AND ACCURACY OF  
CERTAIN DATA IN THE HOUSEHOLD SURVEY

*Completeness of Coverage.* The best idea of the completeness of coverage in the survey may be obtained by comparing the number of dwelling units listed by the canvassers with the number reported in the 1940 Census. The definitions of "dwelling unit" used in the Census and in the survey are very similar.<sup>1</sup> It must be kept in mind, however, that most of the Census schedules were filled out in April and the remainder in May, 1940, whereas most of the survey schedules were filled out in June, July, and August of 1941, and the remainder in March, April, and May of that year. During the eleven to fifteen months between the two undertakings the population of Indianapolis increased substantially because of the rapid expansion of defense work in local industries. Many dwellings were built in this period, and many older houses were remodeled into multiple dwelling units.

A second factor complicating the comparison is the omission from the survey of the blocks in which Negroes were living in 91 per cent or more of the occupied dwelling units according to the 1939 Real Property Inventory of the WPA. In all other blocks, however, an effort was made to fill out a schedule for each dwelling unit occupied by, or available for the occupancy of, white persons.

Another type of omission from the survey should also be noted here. The managers of eight apartment hotels claimed that their leases prevented them from letting any uninvited person call on their tenants; hence they refused admittance to the survey field workers. In three of the buildings, according to managers' statements, there was a total of 133 dwelling units, 73 of which were occupied by married couples, the wife under 45. It is estimated that in

<sup>1</sup> *Census Definition:* "A dwelling unit is defined as the living quarters occupied by, or intended for occupancy by, one household. A dwelling unit may be a detached house; a tenement, flat, or apartment in a larger building (an apartment house, an apartment hotel, or section of a hotel devoted entirely to apartment rather than transient use); or a room in a structure used primarily for business or other nonresidential purposes. It may be a tourist cabin, trailer, railroad car, boat, etc., if occupied by persons having no other place of residence." U. S. Bureau of the Census: Population and Housing, Statistics for Census Tracts, Indianapolis, Ind., and Adjacent Area, 1940. Washington, U. S. Government Printing Office, 1942, p. 2.

*Household Survey Definition:* "A dwelling unit consists of living quarters with house-keeping arrangements. It may be an entire house, or part of a house, such as an apartment, flat, or 'light house-keeping' rooms with cooking facilities. Dwelling units may be located in stores, factories, and shops, or in garages, trailers, and houses on the back of lots. A house originally designed for one dwelling unit may have been remodeled to provide several units." Household Survey of Indianapolis. Instructions to Canvassers. (Mimeographed)

the eight buildings there were between 300 and 400 dwelling units altogether, and 150 to 200 married couples with the wife under 45. The Census enumerators, of course, were given access to these buildings.

According to the survey schedules there were 102,877 dwelling units occupied by white persons, as against 97,749 reported by the Census. Vacant dwelling units available for white occupancy listed in the survey numbered 2,595, whereas 4,178 vacant dwelling units for sale or rent were reported in the Census. Since the Census showed 14,447 dwelling units to be occupied by Negroes (13 per cent of all occupied units) some of the 4,178 vacant dwellings should be classed as available for occupancy by Negroes rather than whites. If the proportion for Negroes is taken at the low figure of 4 per cent, there were approximately 4,000 available for whites. Adding the figures for occupied and vacant gives the total number of dwelling units for whites in Indianapolis as 105,472 according to the survey, and 101,749 according to the Census, a difference of about 3,700.

As emphasized above, part of the difference certainly is due to the new construction and remodeling that took place. Another important part may be due to a more careful interpretation in the survey of the definition of a "dwelling unit," particularly if it consisted of one-room or two-room "apartments" with some cooking facilities in a house which was built originally for one family. On the other hand, the difference would be larger if the canvassers had been allowed to fill out schedules for the 300 to 400 dwelling units in the eight apartment hotels referred to previously. Judging from the later interviews in which approximately 1.5 per cent of the survey schedules were checked, none of the difference can be explained by "padding" in the survey. For the purpose of this report, therefore, it must be concluded that the coverage of the survey was unusually complete.

*Accuracy of Data.* To obtain schedules for nearly all couples is easy of accomplishment compared with obtaining accurate replies. Even in a National Census such a simple matter as the number of young children in the dwelling unit is subject to a not unimportant error, not only in the United States but in other countries also. In 1940, over 6 per cent of the white children under 5 years of age were omitted from the Census. Among Negroes over 15 per cent of the young children were not counted. For the present study the first thing to be mentioned is the fact that a small number—a very small percentage—of the people in the 102,877 occupied dwelling units refused to answer the canvassers' questions. In most of these cases the canvassers were able to locate a neighbor who thought she knew enough about the couple to give approxi-

mately correct answers to most, if not all, of the few questions on the schedule. More important in its bearing on the accuracy of replies is the fact that in a larger number of cases the canvasser was unable to find anyone at home, even though several "call backs" were generally made. In most of these cases, too, the schedules were partially or completely filled out on the basis of information supplied by a neighbor, the landlady, or the apartment house manager. The combined effect of refusals and absences is that approximately 1 per cent of the schedules were too incomplete to be used for analytical purposes, while an additional 10 per cent of the schedules contained data supplied by a person not living in the dwelling unit concerned.

Because of the situation just described, and the unwillingness or inability of other respondents to recall accurately events which occurred in the past, it was realized that there would be inaccuracies in the data. To measure the extent of these errors a special punch card was prepared for a comparison of certain data on the household survey schedules with the presumably more accurate data on the schedules filled out later in the more intensive interviews with about 1,500 women, most of whom were paid for their cooperation this second time. A detailed analysis based on tabulations of these punch cards will be presented in a later report but a few comparisons may be briefly considered here for the items age of wife, number of children ever born, education of the husband and wife, and monthly rental value of the dwelling unit.

The discrepancies of reports regarding age of wife are of small moment (see Appendix Table 1). Discrepancies exist for about 26 per cent of the

Appendix Table 1. Agreement between successive replies regarding age of wife.

DISCREPANCY IN AGE OF WIFE	NUMBER	PER CENT
TOTAL ANSWERING IN BOTH HOUSEHOLD SURVEY AND LATER INTENSIVE STUDY	1,500	100.0
No Discrepancy	1,116	74.4
Age in Household Survey Lower by:		
1 Year	142	9.5
2 Years	34	2.3
3-4 Years	15	1.0
5 or More Years	17	1.1
Age in Household Survey Higher by:		
1 Year	138	9.2
2 Years	21	1.4
3-4 Years	9	0.6
5 or More Years	8	0.5



DISCREPANCY IN NUMBER OF CHILDREN BORN	NUMBER	PER CENT
TOTAL ANSWERING IN BOTH HOUSEHOLD SURVEY AND LATER INTENSIVE STUDY	1,480	100.0
No Discrepancy	1,414	95.5
Number in Household Survey Lower by:		
1 Child	38	2.6
2 Children	2	0.1
3-4 Children	1	0.1
Number in Household Survey Higher by:		
1 Child	19	1.3
2 Children	4	0.3
3-4 Children	2	0.1

Appendix Table 2. Agreement between successive replies regarding total number of children ever born.

1,500 women supplying this item of information the second time, but over three-fourths of them are of only one year. These are divided approximately equally between presumable understatements and overstatements in the household survey. In only about 3 per cent of the cases is the discrepancy as much as three years.

The analysis of discrepancies between the household survey and the more intensive follow-up with respect to total number of children ever born is of particular interest. As indicated in Appendix Table 2, of 1,480 couples supplying this information for the second time, identical reports in the two series are found for 1,414 or 95.5 per cent. Thus, there are discrepancies in only 4.5 per cent of the cases and these are accounted for mainly by presumable understatements and overstatements of only one child in the household survey. Altogether, discrepancies to the extent of more than one child occur in less than 1 per cent of the cases.

Discrepancies between the original and the follow-up data regarding years of schooling completed by the husband and wife occur with approximately the same frequency and magnitude as those pertaining to age of wife (see Appendix Table 3). In 28 per cent of the cases there are discrepancies regarding the husband's education and in 23 per cent of the cases the two reports regarding the wife's education do not agree precisely. However, in both instances approximately half of the discrepancies are those of only one grade in grammar school, or one year in high school or college.

The discrepancies between the two sets of data on rental value of the dwelling unit are more frequent and larger than those pertaining to the other items



DISCREPANCY IN SCHOOL YEARS COMPLETED	HUSBAND'S EDUCATION		WIFE'S EDUCATION	
	Number	Per Cent	Number	Per Cent
TOTAL ANSWERING IN BOTH HOUSEHOLD SURVEY AND LATER INTENSIVE STUDY	1,487	100.1	1,495	100.2
No Discrepancy	1,067	71.8	1,149	76.9
<i>Years in Household Survey Lower by:</i>				
1 Year	95	6.4	70	4.7
2 Years	43	2.9	24	1.6
3-4 Years	19	1.3	15	1.0
5 or More Years	2	0.1	1	0.1
<i>Years in Household Survey Higher by:</i>				
1 Year	156	10.5	137	9.2
2 Years	68	4.6	67	4.5
3-4 Years	31	2.1	31	2.1
5 or More Years	6	0.4	1	0.1

Appendix Table 3. Agreement between successive replies regarding education of the husband and wife.

discussed above (Appendix Table 4). An important reason for this is that in coding the rental discrepancies there was no factual basis for adjusting the data in the follow-up study to the date of the first information. This adjustment could readily be made from the data at hand insofar as age and number of children are concerned, and no such adjustment was needed in

Appendix Table 4. Agreement between successive replies regarding rental value of the dwelling unit.

DISCREPANCY IN RENTAL VALUE OF DWELLING UNIT	NUMBER	PER CENT
TOTAL ANSWERING IN BOTH HOUSEHOLD SURVEY AND LATER INTENSIVE STUDY	1,057	99.9
No Discrepancy	571	54.0
<i>Rental Value in Household Survey Lower by:</i>		
Less Than 5 Per Cent	7	0.7
5-9.9 Per Cent	67	6.3
10-14.9 Per Cent	82	7.8
15-19.9 Per Cent	47	4.4
20-24.9 Per Cent	33	3.1
25 Per Cent and Over	118	11.2
<i>Rental Value in Household Survey Higher by:</i>		
Less Than 5 Per Cent	10	0.9
5-9.9 Per Cent	35	3.3
10-14.9 Per Cent	37	3.5
15 Per Cent and Over	50	4.7

the case of the accomplished fact of past school attendance of married people. Although the interval between the two visits was generally short, extending through only seven months (median 2.6 months), the period in question, the year 1941, was one of rising rentals and it will be noted that the observed discrepancies are mainly in the direction of higher rental values reported in the later visit.

It should also be stated, however, that rental value of the dwelling unit is the one item for which canvassers' estimates were accepted if the information could not be secured from the respondent and if there were similar adjacent dwelling units for which the facts were reported by the occupants. Obviously, in the case of owned homes, the monthly rental values were necessarily estimated in all cases. They were secured, if possible, directly from the respondent or were computed as 0.8 per cent of the owner's estimated market value of the house. Otherwise the canvassers' estimates of market value were accepted under the conditions described above.

Whatever may be the cause and significance of the discrepancies between the two sets of data in regard to rental value, it is apparent that the discrepancies with respect to the other items considered above are mainly of small magnitude and in part compensatory. It should be emphasized, however, that the follow-up study was restricted to a native-white urban Protestant group with at least a grammar school education and that this type of restriction doubtless helps to account for the small magnitude of the observed discrepancies. Furthermore, it is realized that lack of discrepancy does not necessarily signify that the replies are correct, perhaps especially in the matter of age of wife. Nevertheless, the follow-up study was carried out under conditions unusually conducive to the procurement of accurate replies. In general, the foregoing comparisons support confidence in the essential accuracy of the data procured in the household survey.

## APPENDIX B

Number of native-white couples with wife under 45 years of age in the Indianapolis Household Survey, by religion of the couple, age of wife, and monthly rental value of the dwelling unit.

Value of the Dwelling Unit		MONTHLY RENTAL VALUE OF DWELLING UNIT							
RELIGION OF COUPLE AND AGE OF WIFE	Total	\$60 and Over	\$40-59	\$30-39	\$25-29	\$20-24	\$15-19	Under \$15	Un- known
<b>ALL RELIGIONS</b>									
Total 15-44	41,498	2,738	7,654	10,422	5,973	4,660	5,081	3,706	1,264
15-19	1,772	8	98	328	280	289	323	313	133
20-24	7,866	128	979	1,800	1,216	1,108	1,267	975	393
25-29	9,099	325	1,537	2,418	1,356	1,128	1,214	838	283
30-34	8,662	644	1,788	2,275	1,235	866	990	668	196
35-39	7,548	804	1,641	1,966	1,004	709	741	533	150
40-44	6,551	829	1,611	1,635	882	560	546	379	109
<b>Both Protestant</b>									
Total 15-44	33,215	2,037	5,967	8,277	4,773	3,813	4,266	3,136	946
15-19	1,508	5	86	280	241	244	280	265	107
20-24	6,362	91	762	1,450	986	898	1,066	811	298
25-29	7,167	219	1,178	1,885	1,042	933	1,008	697	205
30-34	6,857	482	1,375	1,772	981	695	843	572	137
35-39	6,038	607	1,263	1,568	816	588	610	470	116
40-44	5,283	633	1,303	1,322	707	455	459	321	83
<b>Both Catholic</b>									
Total 15-44	4,492	337	943	1,288	684	446	411	231	152
15-19	93	—	4	23	10	9	21	15	11
20-24	659	9	87	169	112	92	90	58	42
25-29	1,019	45	187	308	197	100	95	57	30
30-34	1,032	78	245	306	145	105	75	45	33
35-39	905	102	234	254	117	75	81	22	20
40-44	784	103	186	228	103	65	49	34	16
<b>Total—Other and Unknown<sup>1</sup></b>									
Total 15-44	3,791	364	744	857	516	401	404	339	166
15-19	171	3	8	25	29	36	22	33	15
20-24	845	28	130	181	118	118	111	106	53
25-29	913	61	172	225	117	95	111	84	48
30-34	773	84	168	197	109	66	72	51	26
35-39	605	95	144	144	71	46	50	41	14
40-44	484	93	122	85	72	40	38	24	10
<b>Protestant-Catholic Mixed Marriages</b>									
Total 15-44	2,413	153	444	597	366	276	263	200	114
15-19	97	—	5	18	16	21	13	16	8
20-24	542	15	74	120	72	82	76	62	41
25-29	592	23	93	164	83	73	73	51	32
30-34	495	36	90	136	84	44	46	31	19
35-39	379	43	94	100	54	27	29	22	10
40-44	308	36	79	59	57	29	26	18	4

<sup>1</sup> Includes the "Protestant-Catholic Mixed Marriages" which are also shown separately in the bottom section of the table.

## APPENDIX C

Number of native-white couples with wife under 45 years of age in the Indianapolis Household Survey, by age of wife and by educational attainment of the husband, the wife, and the couple.

AGE OF WIFE	EDUCATION OF THE HUSBAND												
	Total	Col. 4+	Col. 3	Col. 2	Col. 1	H. S. 4	H. S. 3	H. S. 2	H. S. 1	G. S. 8	G. S. 7	G. S. Under 7	Unknown
TOTAL 15-44	41,498	4,191	676	1,470	1,052	12,303	2,380	4,056	1,887	8,174	1,112	1,356	2,840
15-19	1,772	16	15	26	34	579	221	268	121	299	35	35	11
20-24	7,866	546	122	250	192	3,077	687	873	382	1,000	108	111	51
25-29	9,099	989	177	355	265	3,119	618	995	429	1,253	158	184	59
30-34	8,662	1,097	197	329	219	2,416	399	810	406	1,725	243	274	56
35-39	7,548	857	87	289	200	1,707	259	656	312	2,002	273	354	59
40-44	6,551	686	78	221	142	1,405	196	454	237	1,895	295	398	54
EDUCATION OF THE WIFE													
TOTAL 15-44	41,498	2,319	488	1,269	962	15,865	2,595	4,444	2,300	7,467	1,005	989	1,700
15-19	1,772	—	—	7	17	499	315	383	183	241	30	23	8
20-24	7,866	236	72	169	167	3,719	742	973	462	828	94	75	38
25-29	9,099	522	114	296	228	4,142	612	1,039	494	1,054	126	110	46
30-34	8,662	651	136	336	211	3,277	407	940	486	1,505	189	168	38
35-39	7,548	512	92	240	187	2,377	312	649	372	1,919	264	288	33
40-44	6,551	398	74	221	152	1,851	207	460	303	1,920	302	325	30
EDUCATION OF THE COUPLE													
	Total	Both Col.	Hus. H. S. Col. Wife Col.	Hus. Col. Wife H. S.	Both H. S.	Hus. G. S. Wife H. S.	Hus. H. S. Wife G. S.	Both G. S.	Col. Gram. Combination	One of Both Unknown			
TOTAL 15-44	41,498	3,669	1,315	3,698	17,811	4,437	2,784	6,497	416	871			
15-19	1,772	18	8	73	1,110	221	127	170	3	41			
20-24	7,866	460	191	654	4,644	718	434	568	13	184			
25-29	9,099	856	309	952	4,626	865	503	779	36	173			
30-34	8,662	975	350	878	3,372	1,049	585	1,221	100	132			
35-39	7,548	765	244	642	2,318	876	586	1,818	130	169			
40-44	6,551	595	213	499	1,741	708	549	1,941	134	171			

## ARE MORE MALES BORN IN WARTIME?

CONSTANTINE PANUNZIO<sup>1</sup>

THE belief that more "baby boys" are born during a period of war seems to be common. We cannot tell how far back it goes, but we do know that it prevailed during the last century, during the First World War, and that it is quite general at present. People frequently remark, "Oh, a baby? I bet 'twill be a boy"; or, "Several of our friends have had babies and of course they're all boys." A physician recently stated to this writer that he had attended at the birth of twelve babies during the last two months and that in every case "it was a boy." And the physician asked, "Is there any explanation for it?" The general implication of all these remarks is that a supernatural influence is at work compensating for the extraordinary loss of men in wartime by increasing the number of male births. In fact, the belief is often expressed in so many words.

During the latter part of the last century and the first part of the present one, a number of scholars made systematic inquiries into the matter.<sup>2</sup> Düsing seems to have initiated the investigation and to have stung several persons into studying the matter by boldly stating that the increase of male births in wartime was such a common phenomenon that no one even thought of questioning it. Naturally, several scholars did question it.

The data these early investigators had to work with were fragmentary, ordinarily covering brief periods and single countries. Düsing's studies, for instance, covered only the data for Sweden for the period of the Swedish-Russian War of 1789-1790. He did find that the male-female birth ratio was 1,048 to 1,000 for 1788, 1,047 in 1789, 1,051 in 1790, 1,058 in 1791, 1,051 in 1792, and 1,037 in 1793. But these findings were not conclusive. Comparable data for Russia

<sup>1</sup> University of California at Los Angeles.

<sup>2</sup> These included C. Düsing, P. Geddes, J. von Mayr, A. von Oettingen, A. Rauber, C. A. Revelli, Lexis, Carlberg, Meinzigen, Nixon, Gini, and von Fricks.

did not exist, nor did he have statistics for a sufficiently long period before or after that war to be able to make a convincing statement.

Oettingen's investigation, though, covering a longer period, dealt only with France. He found that the proportion of male births did increase all through the Napoleonic Wars to the end of 1816, that they declined steadily until 1830, and that, as a result of the revolution of July, 1830, the rate again rose, reaching 1,065.6 in 1831. In addition Oettingen found that while the ratio averaged 1,057.6 for the decade 1835-1845 in Holstein, during the wars of 1848 and the years following the ratio went as high as 1,066.7 male to 1,000 female births.

The validity of these findings was then questioned by Lexis who found that a rise in masculinity may occur in periods other than those of war. He found, for example, that the period 1831-1835, which was one of peace, had a high median ratio of 1,065 to 1,000. Moreover, his findings indicated that the Franco-Prussian War left no traces of an increase in masculinity in France. The median ratio of live births all through the period 1866-1875, which was 1,049 males to 1,000 females, was identical for the single years 1871 and 1872, and the ratio rose to 1,058 only in 1873, two years after the war had come to an end.

Von Meinzingen made a detailed study of the births of the Ebistal parish (lower Austria) for two earlier war periods, 1791-1800 and 1841-1850. He discovered that in the first case the masculinity rate rose to a maximum and that in the other the rate descended to a minimum. Carlberg investigated the results of the Turkish-Russian War of 1877-1878 as it affected the province of Livonia and found that the war had left no traces whatsoever in the sex ratio. Finally, Gini examined the birth data for Prussia, Austria, Bavaria, Saxony, and Italy, covering the war of 1866, the records of France and Germany for the period of the Franco-Prussian War of 1870-1871, and those for the Turkish-Russian War of 1877-1878 for Roumania. In all these cases he discovered no material differences in

COUNTRY	1876-1885	1886-1895	1896-1905	1906-1913
Austria	1,065	1,067	1,063	1,063
Belgium	1,058	1,056	1,057	1,053
Denmark	1,058	1,057	1,058	1,054
Finland	—	1,057	1,060	1,065
France	1,062	1,058	1,053	1,056
Germany	1,061	1,061	1,060	1,061
Holland	1,065	1,063	1,062	1,057
Hungary	1,056	1,057	1,061	1,061
Italy	1,069	1,066	1,065	1,062
Norway	1,065	1,069	1,063	1,062
Sweden	1,062	1,060	1,062	1,066
Switzerland	1,063	1,056	1,051	1,055

Table 1. Number of male births per 1,000 female births (live and stillbirths for both) in specified countries, 1876-1913.<sup>1</sup>

<sup>1</sup> Savorgnan, F.: CORSO DI DEMOGRAFIA (Pisa, 1936), p. 86.

the male-to-female birth ratios. Gini, however, did find that after the Serbian-Turkish War of 1876 there was an exceptional rise in masculinity: while the median was 1,068 males to 1,000 females in 1876-1880, in 1877, the year immediately following the war, the ratio stood at 1,076 male to 1,000 female births.<sup>2</sup>

The First World War produced a substantial body of data which permitted a more detailed inquiry. The data available for the period 1876-1913 showed that, broadly speaking, the trend of masculinity during that period was downward. The exceptions were Germany, where the ratio was the same in 1906-1913 as it had been in 1876-1885 and Hungary and Sweden, where the masculinity ratio had gone up. The data for this period, down to the time of the First World War, are presented in Table 1.

The masculinity trend, therefore, seems to have been more or less generally downward, the exceptions being due, Savorgnan believes, to changes in recording procedures. The downward trend, however, may or may not have had any relation to war or peace. It probably resulted from neo-Malthusian practices which, by increas-

<sup>2</sup> One investigator, von Fricks—the only one, so far as I have been able to discover—maintained that it is the proportion of female rather than male births that goes up in wartime. But his data deal only with Prussia and for too very brief a period to be significant.

ing stillbirths and abortions, decreased the ratio of masculinity at birth, since stillbirths and abortion seem generally to take a greater toll of males than females.

Whatever the cause of the previous decline, during the First World War the ratio of male births clearly increased in those countries for which we have records. Sir Bernard Mallet, Registrar-General of England and Wales, called attention to the phenomenon while the War was still going on. In his presidential address before the Royal Statistical Society in November, 1917, Sir Bernard presented figures which showed that male births had increased in England and Wales from 1915 on. The data which he exhibited showed that the ratio of male to female live births in England and Wales had been 1,038 males to 1,000 females for a period of forty years, but that for the period April, 1915 to September, 1917, the ratio had gone up substantially. "For the whole period covered by these 'war births' . . . , the proportion of male to female births was 1,046, or eight above the average of the previous forty years. It may be further remarked that at no period during those years has there been a succession of three quarterly records of over 1,040, while during this war period we have had ten such records."<sup>4</sup>

At the close of First World War other demographers looked into the matter. In April, 1919, de Jastrzebski reported findings covering over four million wartime births which had occurred during the War in Australia, Denmark, Finland, Great Britain, Hungary, Ireland, the Netherlands, and New Zealand. He found "in every case a rise in masculinity more or less marked."<sup>5</sup> In 1921, Franco Savorgnan re-examined all the available data covering the war period and came to substantially the same conclusion.<sup>6</sup> Finally

<sup>4</sup> Mallet, Sir Bernard: Vital Statistics As Affected by the War. *Journal of the Royal Statistical Society*, lxxxi (London, 1918) pp. 14-15.

<sup>5</sup> de Jastrzebski, S.: The Sex Ratio at Birth. *Eugenics Review*, xl (London, 1919-1920) pp. 14-16.

<sup>6</sup> Savorgnan, F.: L'aumento delle nascite maschili durante la guerra (The Increase of Male Births During the War). *Metron*, 1, no. 4 (Padua, 1921) pp. 137-160.



Gaetano Zingali assembled a more comprehensive body of data for the prewar, war, and postwar periods. Those for the prewar and war periods are set forth in Table 2. They clearly show an increase

Table 2. Number of male births per 1,000 female births (live and stillbirths for both) for periods immediately preceding and during First World War, in specified countries.<sup>1</sup>

COUNTRY	1906-1914	1915-1918
Austria	1,063	1,061 <sup>2</sup>
Bavaria	1,062	1,069
Bulgaria	1,070	1,071
England <sup>3</sup>	1,039	1,045
France	1,056	1,063
Germany	1,061	1,069
Hungary	1,061	1,071
Italy	1,062	1,062
Prussia	1,062	1,071
Saxony	1,060	1,068
Scotland <sup>3</sup>	1,042	1,050
Wurttemberg	1,050	1,057

<sup>1</sup> Based on Zingali, G.: *LA NATALITA SPECIALE* (Special Natality), Chapter V; Gini, C. and others, *Demografia* (Turin, 1930), p. 167. Zingali adds that for the Russo-Japanese War the Japanese ratios were 1,049 in 1891-1895, 1,050 in 1896-1905, 1,088 in 1906 and 1,048 in 1907-1914.

It should be added parenthetically that Vedel-Petersen held that in Germany masculinity not only did not rise but that it decreased during the First World War, from 105.8 in 1910-1914 to 103.8 in 1915-1917. His data, however, are fragmentary and inconclusive. See Dumas, S. and Vedel-Petersen, K. D.: *LOSSES OF LIFE CAUSED BY WAR* (Oxford, 1923), p. 175. For the United States no appropriate data existed before 1915. Ciocco has made a cursory examination of the phenomenon as applied to the United States, but comes to no definite conclusion. See Ciocco, A.: *Variations in the Sex Ratio at Birth in the United States*. *Human Biology*, X, No. 1 (Baltimore, February, 1938), pp. 36-64. Thompson also presents tabular data and makes a few remarks but does not undertake a serious examination of the basic phenomenon itself. See Thompson, W. S.: *POPULATION PROBLEMS*. New York, McGraw Hill Book Company, 1942, pp. 48-49.

<sup>2</sup> Confines of 1915.

<sup>3</sup> Live births only.

of masculinity during the World War in the specified countries. In Austria, there seems to have been a decline, but this is believed to be due to incomplete records. In Italy and Bulgaria, the ratios were about the same in both periods.

In order to test the data of the First World War, we need to discover what happened in the years immediately following that war. For only if masculinity decreased in the postwar period does the case for the increase during the War stand up. Savorgnan has assembled the data which answer that question. They are presented in Table 3.

From these data it will be seen that masculinity

did decline in the postwar period. From a peak, reached in 1919, the number of male to 1,000 female births tends generally downward and continues to do so for about eleven years, when most of

the specified countries reach a ratio even lower than that for the period before the War. England and Wales reached the lowest point in 1926 and Belgium in 1929, France, Germany, Italy, and Scotland in 1930 and Hungary in 1932. On the whole, as Savorgnan remarks, the masculinity of all ex-belligerents diminished to a striking extent during the decade following the First World War, which lends added support to the hypothesis that war does increase male births. The present conflict will probably produce many additional data and afford an opportunity for a more careful examination of the phenomenon in question.

Those who have accepted it as a fairly proven fact that war does increase masculinity have sought to explain the phenomenon. Five main explanations have been suggested. The first may be called the natural-compensation explanation. This, of course, is the popular belief couched in pseudo-scientific language. Oettingen, who held to this belief, stated that more males are born in wartime for the simple reason that nature compensates for the greater risk and the

Table 3. Number of male births per 1,000 female births (live and stillbirths for both) for the period following the First World War, in specified countries.<sup>1</sup>

YEAR	BELGIUM	ENG- LAND <sup>2</sup> WALES	FRANCE	GERMANY	HUNGARY	ITALY	SCOT- LAND <sup>2</sup>
1919	1,076	1,060	1,073	1,085	1,082	1,066	1,064
1920	1,069	1,052	1,072	1,077	1,078	1,069	1,043
1921	1,066	1,051	1,060	1,078	1,078	1,065	1,049
1922	1,064	1,049	1,060	1,075	1,074	1,060	1,046
1923	1,065	1,044	1,063	1,073	1,073	1,060	1,051
1924	1,058	1,047	1,056	1,073	1,068	1,063	1,057
1925	1,054	1,045	1,061	1,071	1,071	1,059	1,054
1926	1,053	1,041	1,053	1,068	1,066	1,057	1,045
1927	1,055	1,042	1,052	1,066	1,074	1,061	1,041
1928	1,055	1,044	1,059	1,067	1,067	1,068	1,050
1929	1,050	1,043	1,054	1,068	1,069	1,060	1,059
1930	1,060	1,044	1,049	1,066	1,067	1,054	1,034
1931	1,054	1,049	1,055	1,068	1,067	1,056	1,038
1932	—	1,050	—	1,068	1,064	1,056	1,049

<sup>1</sup> Savorgnan, F.: CORSO DI DEMOGRAFIA, (Pisa, 1936), pp. 96-97.

<sup>2</sup> Live births only.

higher death rate which males experience during war. He implies that we can no more determine the precise manner in which nature brings this about than we can explain one of the greatest enigmas of life, namely, the near-balance of the sexes at birth. This explanation, however, does not appeal to reason. It implies that nature, which has in the first place established the near-balance of the sexes at birth, upon the appearance of the man-made phenomenon of war, takes a daily census, as it were, of both births and deaths, and seeing that the near-balance is being destroyed enters into the reproduction organism to affect the fertilization of the male chromosomes.

H. Ploss advanced a second explanation, namely, that the increase of masculinity in wartime is due to the nutrition deficiency which accompanies such periods. This hypothesis does not seem to be supported by the facts. As Gini and Savorgnan have pointed out, there is no evidence that a correlation exists between the quantity of nutriment and sex at birth. In addition, during the First World War, an increase in masculinity occurred in such countries as England, Australia, and New Zealand where the decrease of nutriment was not great, as well as in Germany and France where the population at certain times came near to starvation. In fact, masculinity increased in England at the very time, as Sir Bernard Mallet pointed out in another connection, that a "generally diffused well-being" prevailed in that country. On the other hand, some support is found for the nutrition hypothesis in the fact that in some regions where nutrition is relatively low the rate of masculinity is exceptionally high. Thus, in Egypt, the rate goes as high as 1,083 males for 1,000 females (1916-1920), in British India to 1,085 males for 1,000 females (1921-1925), and in the Punjab it rises to 1,097 (1912-1914).<sup>7</sup> It is realized, however, that in these countries religion and the mores of the people may be conducive to the under-reporting of female births.

A third explanation is that masculinity increases in wartime be-

<sup>7</sup> Savorgnan, F.: CORSO DI DEMOGRAFIA (Pisa, 1936) p. 100; de Jastrzebski, *op. cit.*, p. 9.

cause during such times the number of first births increases. This hypothesis also is not supported by facts. While first births do produce a higher rate of masculinity than subsequent ones, first births decreased substantially rather than increased during the war period.\*

Fourth, Huxley advances the hypothesis that the increase in masculinity in wartime births is due to the emotional excitement of war. The male chromosomes are fertilized at a greater rate than the female. This hypothesis also has no foundation in experimental data.

Fifth, the most reasonable hypothesis is that of Savorgnan, who has made the most complete study of the masculinity phenomenon. This may be called the birth-interval hypothesis. Briefly stated, Savorgnan maintains that masculinity in births increases in wartime on account of the greater intervals between births, which, in turn, produces greater rest in the female reproductive system and thereby brings about the birth of a larger number of males.

Although Savorgnan presents no evidence that greater intervals between conceptions do occur, he offers the following considerations in support of the assumption that they do. Greater intervals occur, first, because of the wartime absence of males from their homes; second, because of the wider and more prolonged employment of natural lactation during war, which in turn retards the reoccurrence of menstruation and thereby increases the interval between conceptions; and third, because wartime difficulties and bewilderments restrict procreation among certain elements of the population.

But how do greater intervals influence the rate of male births? Savorgnan replies, by producing more prolonged rest and recovery in the female reproductive organism, which, in turn, reduces the rate of abortions and stillbirths; and since the proportion of males in abortions and stillbirths is always higher than that of females,

\* Savorgnan: *ibid.*, pp. 81-82.

the reduction of abortions and stillbirths increases the proportion of males actually born. The effect of stillbirths and abortions in reducing the rate of male births is well-established in some countries, especially in Germany and Hungary.

Savorgnan supports his hypothesis by the following considerations. First, during the First World War the increase in masculinity occurred only, or mainly, in the belligerent countries in which the prolonged absence of militarized men took place. Second, the increase in masculinity begins only in 1916, that is, when the factors producing greater intervals between conceptions came into operation. Third, masculinity gradually increased after 1916 and reached a maximum in 1918-1919, approximately a year after the time when most men were in the war zones, and therefore the interval between conceptions reached its maximum. Finally, as we have already pointed out, there is a marked decrease in masculinity in the post-war period.

Students who have examined the data in detail seem to accept Savorgnan's hypothesis, with qualifications or modifications. Wurzbarger accepts the fundamental premise that rest on the part of the reproductive system is mainly responsible for the increase in wartime masculinity. He also grants that the absence of males is mainly responsible for that fact. However, he maintains that the greater maternity care given by states in wartime, at least in Germany, was also partly responsible for bringing a larger number of conceptions to maturity, which, in turn, increased the masculinity rate. Zingali also adds that factor. In other words, resorting to clinics at a greater rate may have also reduced stillbirths and abortions and thereby increased masculinity at birth. Burkhardt adds that the masculinity increase in wartime is due also, if not mainly, to the rest which occurs in wartime in the male reproductive system. He shows that in Germany, and more so in Prussia and Bavaria, masculinity reached the highest rate in 1919 in consequence of the return of soldiers at the close of the war.

This hypothesis also has loopholes. The main one is that rest in the reproductive organism increases masculinity. This is far from proven. In fact, as we have seen, peoples like those of Egypt and India have a very high masculinity ratio along with a very high frequency of births. Moreover, as Gini has pointed out, if reproductive rest were the determining factor, the human race would have at its disposal one of the most far-reaching of techniques. By reproductive rest sections of mankind could increase the male population at will and thereby have an enormous effect upon their own destiny.

Concluding this examination of the available data and the various explanations, the most that can be said is that there seems to be some evidence that war does increase the ratio of males at birth. The data, however, fairly substantial though they are, are not sufficiently comprehensive to permit broad conclusions.

Insofar as conclusions have been reached, they differ considerably. Gini, who examined the findings of the last century, dismissed the whole matter with the statement that "it is more than doubtful whether there is any relation between war and the sex ratio at birth," and therefore, "the coincidence observed . . . may be regarded with tranquillity as an accidental one."<sup>9</sup> On the other hand, Sir Bernard Mallet, referring to the increase which occurred in England and Wales in 1915-1917, remarked that "A rise in the sex proportion so marked and sustained over so long a period can hardly be dismissed as accidental coincidence."<sup>10</sup> De Jastrzebski, on the basis of a considerably larger body of data, concludes that "So far as the present evidence goes war raises the ratio of masculinity."<sup>11</sup> And Savorgnan comes to the same conclusion.

The present war will no doubt produce a considerable body of data and thereby permit a more careful study of the whole matter.

Assuming that it will be found that war does increase masculin-

<sup>9</sup> Gini, C.: *Il Sesso* (Palermo, 1908) p. 240.

<sup>10</sup> Mallet: *op. cit.*, p. 15.

<sup>11</sup> de Jastrzebski: *op. cit.*, p. 16.

ity, the explanation of the phenomenon itself will call for painstaking investigation and experimentation before sound conclusions can be drawn. Or it may be that this phenomenon will defy the human mind, even as the phenomena of life itself and of the sex balance at birth remain unravelled enigmas.



## MATERNAL MORTALITY AND LENGTH OF LIFE

ALEXANDER STEVENSON<sup>1</sup>

**B**EHIND the life table lies the story of the long and arduous struggle of man to prolong human life. The steady rise in the mean expectation of life which has occurred in the western world during the period of over a century for which we have adequate statistical data is eloquent proof of the very considerable successes which medical science has achieved. Progress has been uneven, however, both with respect to the separate causes of death and to the classes of the population upon which some of these causes bear most heavily, and concern has frequently been expressed over the fact that puerperal mortality, a cause of death which is largely amenable to control by medical treatment, has shown so little improvement. In the words of Mr. Pitt-Rivers, "Public health work has certainly reduced infant mortality, but it is in precisely those countries where the reduction in infant mortality has been effected, that the maternal death rate has remained high."<sup>2</sup> The toll of life taken by an individual cause of death can be decreased, either by improvements in preventive medicine which lessen the number of persons exposed to the risk of death from that particular cause, or by more successful treatment of those who do run that risk. Now it is obvious that, viewed from this standpoint, maternal mortality presents a problem of quite special interest. The most striking recent demographic phenomenon of the western world has been the steep and steady decline of fertility roughly since the last quarter of the nineteenth century. When fertility declines, maternal mortality will, other things being equal, account for fewer victims among all women since fewer women will be exposed to the risk of death

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<sup>2</sup> Pitt-Rivers, G. H. L. F.: The Problem of Maternal Mortality. *Eugenics Review*, January, 1935, p. 277. Cf. also Dublin, L. I. and Lotka, A. J.: *TWENTY-FIVE YEARS OF HEALTH PROGRESS*. New York, Metropolitan Life Insurance Company, 1937, p. 345.



from puerperal causes. It is the purpose of this paper to investigate the effect of the changing incidence of diseases and accidents of childbirth upon the mean expectation of life of females, and to attempt to show separately the effect on that life expectation of less frequent exposure to the risk of death from puerperal causes—in other words, of declining fertility. Because of the excellence of its demographic data, Sweden was chosen for the investigation. Deaths are registered by place of residence rather than by place of occurrence so that mortality rates are automatically corrected for effects of hospitalization. Since an important urban-rural fertility differential exists, the subdivision by urban and rural areas was preserved.\*

#### THE EFFECT OF MATERNAL MORTALITY ON LIFE EXPECTANCY

The pioneer work by Bernouilli, d'Alembert, Farr, and more recently by Dublin and Lotka, has shown the method and significance of constructing life tables with individual causes of death eliminated.<sup>4</sup> By comparing such a life table with the life table con-

\* Confinement figures by age groups were obtained from SVERIGES OFFICIELLA STATISTIK. BEFOLKNINGSRÖRELSEN, deaths from all causes and maternal mortality data from DÖDSORSAKER. Unfortunately no information on deaths by causes is available for the years before 1911 and in addition the subdivision by age groups is not as detailed as would have been desirable, being by ten-year groups for the years prior to 1923. Population figures were obtained from the censuses of 1910, 1920, 1930, and 1935.

<sup>4</sup> Interest in the effect of single diseases upon the mean expectation of life seems to have been aroused in the early eighteenth century. News had been brought to France from the eastern Mediterranean region and the Middle East of the possibility of avoiding the dreaded smallpox by inoculation. A violent controversy ensued over the merits and demerits of treatment and in the course of it the mathematician, Daniel Bernouilli evolved a method of constructing a life table with the single cause of death, smallpox, eliminated. Shortly afterwards the method was criticized and improved by d'Alembert, and Duvillard calculated the increase in life expectancy which the elimination of death from smallpox would bring about. For historical and methodological discussion of the problem, see

(a) Karn, M. Noel: An Enquiry into Various Death-Rates and the Comparative Influence of Certain Diseases on the Duration of Life. *Annals of Eugenics*, 1931, iv, pp. 279-326.

(b) ———: A Further Study of Methods of Constructing Life-Tables When Certain Causes of Death Are Eliminated. *Biometrika*, 1933, xxv, pp. 91-101.

(c) Farr, William: Effect of the Extinction of Any Single Disease on the Duration of Life. *Supplement to the Thirty-fifth Annual Report of the Registrar-General for England and Wales*, 1873.

(d) Dublin, L. I. and Lotka, A. J.: *LENGTH OF LIFE*. New York, The Ronald Press Company, 1936, p. 121 ff.

(e) Irwin, J. O.: Recent Advances in Mathematical Statistics. *Journal of the Royal Statistical Society*, 1935, 98, p. 105 ff.

structed from the actual age-specific death rates, *i.e.*, with all causes operative, we can calculate the gain in life expectation which the elimination of the specific cause would bring, or in other words, the years or fractions of a year forfeited to that cause by a person in the life table population. If we carry through this calculation at different periods we can then observe the variation in years lost to the specific cause under observation, in this case maternal mortality.

In the present investigation a short method of computing the life tables is used, which does not involve the calculation of the probability of dying.<sup>\*</sup> The age-specific death rates used in constructing the life table with deaths from diseases and accidents of childbirth eliminated are obtained as follows: If  $P$  is the observed population in a given age group,  $M^i$  the observed deaths from the cause  $i$  to be eliminated, and  $M^{-i}$  the observed deaths from all other causes, then the observed age-specific mortality rate from cause  $i$ ,  $m^i$  may be expressed as  $\frac{M^i}{P}$  and the observed age-specific mortality rate from all other causes  $m^{-i}$  may be expressed as  $\frac{M^{-i}}{P}$ . It follows that the hypothetical number of deaths which would occur in the age group, were the single cause  $i$  eliminated, would be

$$\overline{M}^{-i} = P \cdot m^{-i} + \frac{1}{2} P \cdot m^i \cdot m^{-i},$$

since to those who actually die from all other causes ( $P \cdot m^{-i}$ ) must be added a number of deaths among those "saved" by the elimination of the cause  $i$ . Assuming that deaths from cause  $i$  are distributed evenly throughout the period, those "saved" from it ( $P \cdot m^i$ ) will on the average be subject to the death rate from all other diseases ( $m^{-i}$ ) for half the period. Thus the hypothetical death rate from all other causes with cause  $i$  eliminated, is

$$\overline{m}^{-i} = \frac{\overline{M}^{-i}}{P} = m^{-i} (1 + \frac{1}{2} m^i).$$

Certain assumptions are implicit in this calculation and these

<sup>\*</sup> For the method of computation see Doering, Carl R. and Forbes, Alice L.: A Skeleton Life-Table. *Proceedings of the National Academy of Sciences*, 1938, 24, pp. 400-405.

must be taken into account when the results are evaluated. It is assumed that the risk of death from the cause *i*, maternal mortality, is independent of all other risks of death; in other words the whole problem of joint causes of death is assumed away.<sup>6</sup> It is further assumed that death from cause *i* strikes at random among the individual members of the cohort of females and does not weed out the weaklings. If it did operate selectively in this way those "victims" of cause *i* who "survive" when it is eliminated would not be subject to the average death rate from all other causes.<sup>7</sup> The limitations of the data also introduce the possibility of inaccuracy. In constructing the life tables based on age-specific death rates for ten-year age groups we must assume that deaths are evenly distributed throughout the age interval. Obviously this is not true in the case of maternal deaths, especially in the older age groups. The accuracy of the more recent figures (1930-1931 and 1935-1936), however, was to some extent controlled by recomputing the life tables for five-year age groups. Little distortion seems to have been introduced by the ten-year age groupings<sup>8</sup> since the results based on the five-year age

<sup>6</sup> For rules governing classification in the United States when both puerperal and non-puerperal causes appear on the death certificate, *cf.*: Maternal Mortality in Fifteen States. Children's Bureau Publication No. 223, 1934, p. 6. Washington, D. C., United States Department of Labor.

<sup>7</sup> Indeed this is part of the eugenist explanation of the high maternal mortality rates in western countries, *e.g.*, "Survival of the strains of pregnancy and parturition depends far more on constitutional fitness and stamina than on medical preparation and obstetrical assistance. The child's chances of survival, however, are increasingly dependent, not upon its constitutional and hereditary robustness, but upon its protection from bacterial attack and the artificial and medical assistance it receives. In short, we save the weak or defective potential mothers at birth and during childhood, who become increasingly unfitted themselves to survive the test of giving birth." Pitt-Rivers: *Weeds in the Garden of Marriage*. Cited in Pitt-Rivers, *loc. cit.*, pp. 278-279. Mr. Pitt-Rivers' statement, even if correct, does, however, admit of a more optimistic interpretation. His argument, rephrased, is simply that some of the more delicate females who in an earlier period died in infancy or in childhood now live ten or even twenty years longer.

<sup>8</sup> Years forfeited at birth to maternal mortality.

	BASED ON TEN- YEAR AGE GROUPS	BASED ON FIVE- YEAR AGE GROUPS
Sweden, urban (1930-1931)	0.215	0.205
Sweden, urban (1935-1936)	0.172	0.170
Sweden, rural (1930-1931)	0.261	0.262
Sweden, rural (1935-1936)	0.208	0.209

groups did not differ significantly from those based on mortality rates for ten-year age groups.

Table 1 (top section) shows the potential years of life lost to puerperal causes of death. At first sight the magnitudes involved do not seem large, the greatest loss charged to maternal mortality being 0.40 years in rural Sweden in 1910-1911. That is to say, if there were no deaths from puerperal causes, a girl aged 20—in the life table

Table 1. Trends in years of life lost to puerperal causes and percentage of remaining years of life lost to puerperal causes among Swedish females, by age and rural-urban residence.

YEARS	AGE								
	0	1	5	10	15	20	30	40	50+
YEARS OF LIFE LOST TO PUERPERAL CAUSES									
<i>Rural</i>									
1910-1911 <sup>1</sup>	.35	.37	.38	.39	.40	.40	.26	.05	.00
1920-1921	.30	.32	.33	.33	.34	.33	.21	.05	.00
1930-1931	.26	.27	.28	.28	.28	.26	.16	.03	.00
1935-1936	.21	.22	.22	.22	.22	.21	.12	.03	.00
<i>Urban</i>									
1910-1911 <sup>1</sup>	.16	.18	.19	.19	.19	.19	.11	.03	.00
1920-1921	.21	.23	.23	.24	.24	.23	.12	.03	.00
1930-1931	.21	.22	.23	.23	.23	.22	.12	.03	.00
1935-1936	.17	.18	.18	.18	.18	.18	.09	.02	.00
PERCENTAGE OF REMAINING YEARS OF LIFE LOST TO PUERPERAL CAUSES									
<i>Rural</i>									
1910-1911 <sup>1</sup>	.58	.59	.63	.69	.76	.82	.64	.16	.00
1920-1921	.49	.50	.54	.58	.64	.67	.51	.16	.00
1930-1931	.41	.42	.44	.48	.53	.53	.38	.09	.00
1935-1936	.32	.32	.34	.37	.41	.42	.27	.08	.00
<i>Urban</i>									
1910-1911 <sup>1</sup>	.28	.29	.31	.33	.37	.39	.28	.11	.00
1920-1921	.35	.35	.38	.41	.45	.47	.29	.10	.00
1930-1931	.34	.34	.36	.39	.43	.44	.29	.09	.00
1935-1936	.26	.27	.28	.31	.33	.36	.22	.05	.00

<sup>1</sup> In calculating the 1910-1911 figures the deaths for 1911 were applied to the female population at the Census of December 31, 1910, since the 1910 mortality statistics are not subdivided by age and cause.

population of rural Sweden in 1910-1911—would live, on the average, 0.40 years longer than she would under existing mortality conditions. A clearer idea of the significance of the figures is obtained, however, if they are expressed as percentages of the remaining expected years of life. This is done in the lower section of Table 1.<sup>\*</sup> Both the absolute and relative figures increase slightly up to age 20 years and then decline to zero at all ages over 50 years, when the cause is no longer operative. Throughout the period under consideration the toll of years taken by puerperal deaths is consistently greater in the rural than in the urban areas, but this differential has become steadily smaller.

In rural areas there was a steady improvement at all ages from 1910-1911 to 1935-1936. At age 20 years, when the percentage of the remaining potential years of life forfeited to puerperal causes reaches its maximum, the years of life lost fell from 0.40 years in 1910-1911 to 0.21 years in 1935-1936, equivalent to a decline in the percentage of the remaining years of life lost to puerperal causes from 0.82 per cent in 1910-1911 to 0.42 per cent in 1935-1936. These figures may at first glance look rather insignificant. It must be noted, however, that whereas the actual increase in expectation of life at birth from 1910-1911 to 1935-1936 was 5.57 years, at age 20 years it was only 2.22 years. Thus the years gained at the expense of puerperal causes of death between 1910-1911 and 1935-1936, 0.19 years, were equivalent to about 8.6 per cent of the actual gain in the expectation of life at that age.

In urban areas the evolution of the figures is very different. At age 20 the years lost to puerperal causes of death rose from 0.19 years in 1910-1911 to 0.23 years in 1920-1921 and then fell again gradually to 0.18 years in 1935-1936. At that age the percentage of the remaining years of life forfeited to maternal deaths rose from 0.39 per cent in 1910-1911 to 0.47 per cent in 1920-1921 and then declined to

<sup>\*</sup> It must also be borne in mind that in comparisons over time the result is affected by changes in mortality from other causes as well as from changes in mortality from the single cause under observation.

0.36 per cent in 1935-1936. Thus maternal mortality was practically as important a cause of death among the total urban female population at the end of the period under observation as it was at the beginning.

#### THE TREND IN PUERPERAL RISK RATES

The puerperal risk rate in Sweden is obtainable from the formula  $\frac{M^i}{C}$ , where  $M^i$  is the number of maternal deaths definitely ascribed to the puerperal state, and  $C$  the number of confinements.<sup>30</sup> Deaths from puerperal causes represent deaths where diseases and accidents of pregnancy are considered the sole or the principal cause. The accuracy of the figure thus depends upon the accuracy of diagnosis and this may vary both as between doctors and over time. In the case of maternal mortality this might not be expected to present much cause for uneasiness. But from the point of view both of diagnosis and of classification the problem of abortion introduces an element of uncertainty,<sup>31</sup> since the numerator  $M^i$  includes some, but not all post-abortive deaths,<sup>32</sup> a great part of which probably take place in the earlier months of pregnancy. It includes only those cases of death where the primary cause is connected with childbirth and excludes deaths of child-bearing women where other causes are said to be of primary importance. Thus changes in death certificate procedure or in death rates from other nonpuerperal causes which occur in conjunction with and take precedence over puerperal causes might cause spurious variations in the number of deaths

<sup>30</sup> For a good discussion of the reliability of maternal mortality rates with special reference to the United States, see Woodbury, Robert M.: *Maternal Mortality*. Children's Bureau Publication No. 158, 1926, pp. 3-21. Washington, D. C., United States Department of Labor.

<sup>31</sup> For instance, at the 1938 meeting of the International Commission for the Decennial Revision of the International Nomenclature of Diseases it was unanimously agreed that after 1940 criminal abortions would be classified as due to puerperal causes. Previously they had been classified under homicide. However, no such changes appear to have been made in the period under observation.

<sup>32</sup> Although criminal abortions were classified throughout the period under homicide, many criminal abortions are probably entered under puerperal causes.

assigned to puerperal causes.<sup>33</sup> The denominator *C* obviously excludes the successful abortions and also the foetuses born in the earlier months of pregnancy. Since it automatically eliminates possible distortion which might be caused by plural births or by unregistered stillbirths it is, however, preferable to a rate based on total births and may therefore be regarded, subject to the above qualifications, as a reasonably accurate measure of the risk of death run by women in those cases of pregnancy which develop to or near to the normal term of viability.

The evolution of this rate showed some interesting features. (See Table 2.) In rural areas it fluctuated irregularly around a level of about 2.5 deaths per 1,000 confinements throughout the period 1911 to 1936, a slight rise being apparent after 1925. In urban areas, the rate in 1911 was 1.89 per 1,000 but quickly rose above the rural level and reached 3.59 in 1919. After some improvement another peak was reached in 1929 when the rate was 4.71, followed by an irregular downward movement to 4.02 in 1936.<sup>34</sup>

When age-specific maternal death rates are computed it becomes evident that the risk of death is relatively high for very young mothers and for those in the upper age groups. Direct standardization (by ten-year age groups) showed that changing age-composition of mothers caused no significant distortion (see Table 2). Again, the risk of death is much greater for plural than for single births. Since, however, the percentage of multiple pregnancies is a small and probably more or less constant fraction of the total, it will not affect the accuracy of the rate appreciably. Medical statisticians have shown that the mortality risk is greater for first than

<sup>33</sup> e.g. In cases where two causes, one puerperal and the other not, are listed, and the non-puerperal cause takes precedence, a decline in the latter will, *cet. par.*, cause a rise in the maternal death rate.

<sup>34</sup> The divergence between the two rates makes it clear that if any significant change in death certificate procedure occurred it did not affect rural and urban areas equally. Part of the spread between rural and urban puerperal risk rates may be spurious since abortions are not included as confinements and thus appear in the numerator but not in the denominator of the fraction. Cf. pp. 298-299 *supra* and pp. 301-302 *infra*.



YEAR	RURAL		URBAN	
	Crude Rate <sup>1</sup>	Standardized Rate <sup>2</sup>	Crude Rate <sup>1</sup>	Standardized Rate <sup>2</sup>
1911	2.89	2.89	1.89	1.89
1912	2.43	2.42	1.93	2.25
1913	2.34	2.34	1.98	1.98
1914	2.61	2.62	2.48	2.47
1915	2.98	2.97	2.57	2.57
1916	2.73	2.73	2.36	2.36
1917	2.28	2.28	2.88	2.87
1918	2.30	2.30	3.31	3.31
1919	3.03	3.06	3.59	3.61
1920	2.48	2.51	3.05	3.05
1921	2.69	2.74	2.59	2.60
1922	2.35	2.38	2.88	2.86
1923	2.24	2.23	2.46	2.10
1924	2.10	2.10	3.08	3.07
1925	2.47	2.53	3.00	3.00
1926	2.81	2.84	3.20	3.22
1927	2.61	2.68	3.14	3.09
1928	3.03	3.11	3.92	3.90
1929	3.41	3.46	4.71	4.71
1930	3.04	3.08	4.53	4.73
1931	3.33	3.44	4.41	4.53
1932	3.07	3.24	4.23	4.35
1933	2.85	2.94	3.48	3.65
1934	3.30	3.43	3.23	3.33
1935	2.80	2.87	3.63	3.75
1936	2.69	2.88	4.02	4.18

<sup>1</sup>  $\frac{M^1}{C}$ 
<sup>2</sup> Standardized with the age composition of 1911 as a base. Since data are available only by ten-year groupings over 20 years of age, the standardization is not entirely satisfactory.

Table 2. Puerperal risk rates per 1,000 confinements.

for subsequent confinements.<sup>35</sup> As the average size of family decreases with the decline in fertility the proportion of first confinements rises, and consequently one might expect this factor to exert an upward pressure on the maternal death rate. Unfortunately, maternal deaths and confinements subdivided by order of birth are

<sup>35</sup> Cf. New York State Department of Health. 55TH ANNUAL REPORT, 1934, ii, p. xlv.

 Dublin, Mary: Maternal Mortality and the Decline of the Birth Rate. *Annals of the American Academy of Political and Social Science*, November, 1936, 188, pp. 107-116.



not available for Sweden. Studies based on data for Australia and New York State<sup>36</sup> showed that standardization of crude rates for changes in composition as regards order of birth did not change the rate significantly, the high mortality of primiparae being largely offset by the elimination of higher orders (*e.g.*, sixth, seventh, and eighth, etc.) where mortality was also high. It must be noted, however, that as average family size continues to decrease, the elimination of third and fourth confinements, where puerperal risk rates are apparently very much lower than for primiparae, declining fertility may well mask an improvement in maternal mortality. With given fertility rates an increase in primiparae would therefore tend to *lower* the mean expectation of life of females. Changes in family size may have accounted for some part of the increase in maternal mortality in urban Sweden and it is unfortunate that the influence of this factor cannot be controlled.

Perhaps the most probable source of distortion in the puerperal risk rates is the changing frequency of abortion. Little quantitative information on this problem in Sweden is available but the opinion is generally accepted that it is a very important cause of death in the puerperal state,<sup>37</sup> and furthermore, it is believed that abortion frequency did rise in the 1920's.<sup>38</sup> Obviously, other things being equal, an increase in abortion rates would tend to raise the maternal mortality rate, since the chances of death, in particular from infection, after abortion are probably greater than following a normal confinement.<sup>39</sup> In the most recent figures for Sweden—1935-1937—separate figures were published of deaths from septicemia following upon an abortion and after a confinement. These figures show that

<sup>36</sup> Cf. footnote 15.

<sup>37</sup> Data for the United States are to be found in *Maternal Mortality in Fifteen States*. Children's Bureau Publication No. 223, 1934, p. 103. Washington, D. C., United States Department of Labor.

<sup>38</sup> Cf., Myrdal, Alva: *NATION AND FAMILY*. New York and London, Harper and Brothers, 1941, p. 206.

<sup>39</sup> Cf., *Maternal Mortality in Fifteen States*. Children's Bureau Publication No. 223, 1934, p. 116. Washington, D. C., United States Department of Labor.

post-abortive infections account for around half of the deaths from puerperal septicemia.<sup>30</sup> Data published in the Swedish medical statistics indicate that at least from 1931 to 1935 the majority of these deaths were registered in the cities—and Sweden is a predominantly rural country—and that by far the highest rate consistently occurred in Stockholm.<sup>31</sup> These data are fragmentary but they do show, first that post-abortive infection is a very important cause of death assigned to puerperal causes, and secondly that, if reporting is equally accurate, it is primarily an urban phenomenon. The period for which figures are available is too short for an examination of the variations in the proportion of puerperal deaths represented by post-abortive infections to yield useful results, but it is obvious that even a slight increase in the frequency of abortion would be sufficient to mask an improvement in the mortality of mothers.

#### SUMMARY

We are now in a position to draw our results together. Over the period 1911 to 1936, the potential years of life lost to puerperal causes of death by a woman in the life table population in rural Sweden declined considerably while the real puerperal risk rate fluctuated around a constant level. In urban areas, on the other hand, the years lost to puerperal causes remained almost constant while the puerperal risk rate, so far from falling, rose very considerably. Thus we may conclude, subject to the qualifications concerning changes in reporting, decreasing family size and changes in abortion rates, that in rural areas almost all the increase in life expectancy of females at the expense of puerperal causes of death is apparently due to less frequent exposure to the risk of death from diseases and accidents of childbirth, or in other words to the decline

<sup>30</sup> In 1935 for 49 per cent, in 1936 for 54 per cent, and in 1937 for 37 per cent. *Cf.* LEAGUE OF NATIONS. HEALTH ORGANIZATION. ANNUAL EPIDEMIOLOGICAL REPORTS. Similar results were obtained from the United States Children's Bureau. *Op cit.*, p. 116.

<sup>31</sup> SVERIGES OFFICIELLA STATISTIK. HALSO- OCH SJUK-VARD. ALLMAN HALSO- OCH SJUK-VARD. Table 3, 1931-1935.

in fertility, especially among older women. In urban Sweden the rise in the real puerperal risk rate, which may be associated with an increase in abortion, was sufficient to offset the effect of declining fertility on the mean expectation of life of the female life table population.

# ANNOTATIONS

## POPULATION PROBLEMS<sup>1</sup>

FOR many years Professor Thompson's *POPULATION PROBLEMS* has been the leading textbook on demography. The reason, as those of us know who have used it in teaching, is that no other population text is so comprehensive and thorough. Based on the author's wide experience as Director of the Scripps Foundation for Research in Population Problems, it touches every aspect of the subject except the statistical techniques. It devotes most of its space to the American population, but also deals with human numbers throughout the world, especially in the Orient. The publication of a third edition, which brings the material up to date (though some 1940 data were still unavailable), represents therefore a major event in the diffusion of demographic knowledge.

In addition to bringing the 1935 edition up to date, the present volume introduces numerous changes of content. The discussion of factors in the declining birth rate, for example, has been considerably expanded. The treatment of the modern city, which formerly took four chapters, has been advantageously cut to less than half that length. The old chapter on migration has been expanded to two chapters, one on external and the other on internal migration. The old chapter on optimum population has been dropped, and a new one added on the economy of a stationary or declining population. Finally, a new section on the effects of war on population has been added. These changes, on the whole, have improved the book.

The point of view has been changed less than the content. Professor Thompson, after examining Malthusian and post-Malthusian doctrines, remains an eclectic skeptic with reference to population theory. He sees some value in most of the theories of population, but he himself makes no attempt to develop a complete theory. He thinks, indeed, that this

<sup>1</sup> Thompson, Warren S.: *POPULATION PROBLEMS*. New York, McGraw-Hill Book Company, 3rd edition, 1942, 471 pp. \$4.00.

cannot be done, on the ground that conditions vary too greatly. Yet he states his views with relation to population policy so definitely that one may perceive in the background an implicit theory of population—a theory which gives population a very important place in national and international affairs.

Devoting three chapters to population growth as related to agriculture, industry, and trade, the author holds the view that industry and commerce may advance more rapidly than a fast-growing population and thus constitute, for a time, a solution to the problem of numbers, but in the end fertility must be reduced or the nation will be driven to nationalistic expansion (by war if necessary). Similarly, in the three chapters on the birth rate he makes the point that the class differences in fertility will probably diminish in the future as the lower classes adopt birth control, but that the differential birth rate between nations may prove to be a growing problem. The nations which still have a high fertility, especially those of Eastern Europe, Asia, and Latin America, will probably reduce their death rates and thus experience, in the next few decades, a much faster growth than the countries of Western Europe, North America, and Australia. This, according to the author, will probably bring about additional wars, unless we cede to the expanding countries—notably Japan, Germany, and Italy—new territories. He admits, however, that this could be only a temporary solution, for within fifty years, if the world's population continues to grow at the present rate, the new territories will be filled up. Behind his Chamberlainesque point of view there lies an exceedingly complex but unexpressed theory of the relation of population changes to political institutions, a theory which, in the reviewer's opinion, he should explore more fully and consciously. Many students of population will agree with Professor Thompson on the demographic facts and humanitarian values, but not on the matter of policy, because their theory of the relation of population to politics differs from his.

Population research has gone ahead so fast in recent years that a staggering amount of factual material must be brought together in a book of this sort. It is not surprising that few individuals have lately written texts covering the entire population field. Though many specialists will disagree with various parts and with the general point of view of the book, Professor Thompson deserves credit for the challenging and comprehensive manner in which he has accomplished his task.

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